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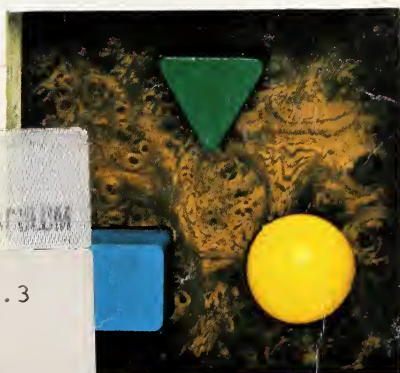
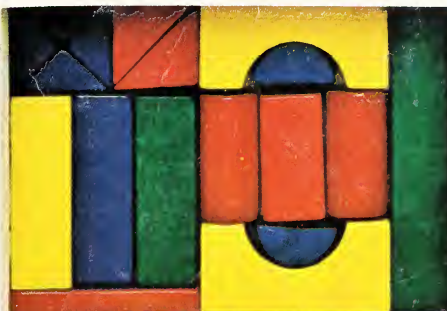


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Exploring Science

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Exploring Science

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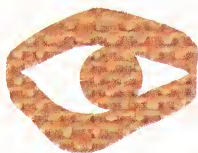
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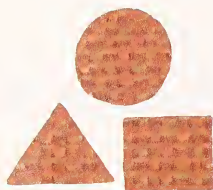
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1 Your Senses



Preparing for the unit: For a list of instructional materials helpful in teaching this unit, see page T11 of the Teacher's Manual. These instructional materials include general references for the teacher, books for children, and filmed or recorded materials. You may also wish to check the

list of materials needed for each "Finding Out" activity in this unit and have the children begin collecting these materials. The list of materials for each "Finding Out" activity is given under "Teaching helps for Finding Out" on pages 9, 14, 17, 19, and 21.



How is Mark finding out about things around him?¹

How do you find out about things around you?²

Introducing the unit: You may wish to have the children look at the cartoon above. Then have the children read the questions below the cartoon and discuss their answers to the questions.
Sample answers for questions below the cartoon:

¹ Mark is finding out about things around him by smelling, by hearing, by tasting, and by touching.
² I find out about things around me by smelling, by hearing, by tasting, by touching, and by seeing.

Seeing



How are these children finding out about things?¹

How does seeing help you find out about things?²



Main concept of the lesson (pages 8–9):

Seeing helps people find out about things around them.

Performance objective: After studying the information provided in this lesson, the children should be able to

—tell how seeing helps them.

Important word: seeing.

Suggested activity: Have the children play a game called I See. To play, they will need to pick a

leader. The leader then picks an object, but does not say what the object is. Instead, the leader describes the object for the rest of the children. For example, the leader says, "I see something that has two wheels, two pedals, and a seat. What do I see?" The child who guesses the object becomes the next leader.

¹ Sample answer: By using their eyes.

² Sample answer: Seeing helps me find out about the color, the shape, and the size of things.

FINDING OUT

- Make a magnifying glass like the one in the picture.
- Hold some small things under it.



Does your magnifying glass help you find out about things? If so, how?

Teaching helps for "Finding Out"

Materials needed: container (such as an oatmeal or a cornmeal container), scissors, sticky plastic wrap, rubber band, water.

Experiences used: observing, comparing, describing, relating information.

Game methods: The children may say that the objects they find under their "magnifying glass" looked bigger than when these objects were not held under the "magnifying glass." The children

may infer that their "magnifying glass" helped them find out about things because it made the objects they placed under it easier to see.

Additional information: To make a "magnifying glass," the children should cut two holes in a cardboard box (staple is help enough for them) and to pass through. They are should make the plastic wrap over the top of the container, hold the wrap in place with a rubber band, and pour some water on the wrap.

Hearing



Main concept of the lesson (pages 10-11):

Hearing helps people find out about things around them.

Performance objective: After studying the information provided in this lesson, the children should be able to

—tell how hearing helps them.

Important words: hearing, sounds.

Suggested activity: You might have the children draw pictures of things that make sounds. Then have the children hold up their pictures one at a time and have the rest of the children make the sound of each thing shown.

What sounds are being made
in the pictures?¹

How does hearing help you
find out about things?²



Suggested activity: Now you might ask the children the following questions and have them answer these questions by making the sound they think each thing would make: If you could hear grass grow, what would it sound like? If you could hear an ant with boots on walking in the rain, what would it sound like? If you could hear a banana being peeled, what would it sound like?

¹ **Sample answer:** The sound of musical instruments, hammering, a cat meowing, a lawn mower, and clapping.

² **Sample answer:** Hearing the sounds that some things make helps me find out what these things are. Hearing helps me tell what direction a sound is coming from.

Touching



12



Main concept of the lesson (pages 12-15):
Touching helps people find out about things around them
Performance objective: After studying the information

provided in this lesson, the children should be able to:
- tell how touching helps them
Important words: touching



What are these children finding out by touching?

How is touching important to you?

Suggested activity. You may wish to help the children discover that they can determine the shape of many things and what many things are made from by using only their sense of touch. For the children to do this, you might put several different kinds of objects in a large paper bag. You might include objects of different shapes, objects of different textures, and objects made from different materials. Then pass the paper bag

take a round object out of the bag without looking in the bag. Then pass the bag to another child and have that child take a plastic object out of the bag, and so on until every child has had a turn.

Sample answer: They are finding out about some things around them.

Sample answer: Touching is important to me because it helps me tell when things are hot

FINDING OUT

- ▶ Close your eyes.
- ▶ Hold a glass of warm water and a glass of cold water.
- ▶ Tell which glass of water feels warm and which feels cold.



14

Teaching helps for "Finding Out":

Materials needed: 2 drinking glasses; warm and cold water; foods which are hard, such as pretzels; foods which are soft, such as marshmallows.

Processes used: observing, comparing, communicating.

Sample findings: The children will most likely

have no difficulty in identifying which glass of water feels warm and which feels cool. They also will most likely be able to identify which food feels hard and which food feels soft.

Extending the "Finding Out": After the children have completed this "Finding Out," you might have them see if they can identify certain things

- ▶ Taste some foods.
- ▶ Tell which food feels hard and which feels soft.



How else might things feel to you?¹
 What other parts of your body
 can you feel with?²

by using only their sense of touch. For the children to do this, you might have them make a "mystery box." Have one child place common objects such as a pencil, a bottle cap, an eraser, some string, and a block of wood into the "mystery box." Have some other children who have not seen the objects close their eyes and reach into

the box. Have the children do this one at a time. Then have each child guess what an object is by touching it.

¹ Sample answer: Some things might feel sharp, dull, rough, or smooth.

² Sample answer: I can feel things with almost every part of my body.

Smelling



How are these children finding out about things?¹

16

Main concept of the lesson (pages 16–17): Smelling helps people find out about things around them.

Performance objective: After studying the information provided in this lesson, the children should be able to
= tell how smelling helps them.

Important word: smelling.

Suggested discussion: When discussing “Smelling,” you might ask the children this question: What things do you know by the smell they make? (Sample answer: Popcorn, perfume, smoke, chocolate cake.)

¹ **Sample answer:** By smelling.

FINDING OUT

- ▶ Close your eyes.
- ▶ Have a friend hold some things in front of your nose.
- ▶ Guess what each thing is.



Which things did you
guess right?
Is smelling important to you?
If so, why? ¹

17

Teaching helps for "Finding Out":

Materials needed: Things with a strong odor, such as vinegar, lemon juice, onion, flowers.

Processes used: observing, communicating, inferring

sample finding: The children will most likely identify most of the objects, especially those they have smelled many times before.

Sample answers: Yes. Because it helps me find out about things around me.

Suggested discussion: After the children have completed this "Finding Out," you might want to point out that people are sometimes warned of possible dangers because they recognize the smell of certain things such as smoke (what are two gasoline fumes that they recognize?) or chlorine (what might do it to them?) or that they should smoke outdoors, or gasoline without a pump, or smoke.

Tasting



What are some foods
you like the taste of?



Main concept of the lesson (pages 18–19):
Tasting helps people find out certain things about
foods.

Performance objective: After studying the infor-

mation provided in this lesson, the children should
be able to

—tell how tasting foods helps them.

Important words: taste, tasting.

FINDING OUT

- ▶ Taste some foods.
- ▶ Tell which foods taste sweet.
- ▶ Tell how the other foods taste.



Is tasting important to you?
If so, why?¹

19

Teaching helps for "Finding Out":

Materials needed: foods such as pickles, pretzels, fruits, cake.

Processes used: observing, comparing, communicating, inferring.

Sample findings: The children will most likely find

that besides the foods which taste sweet, there are also some foods which taste sour, salty, or bitter.

¹ Sample answers: Yes. Because tasting is what makes eating foods pleasant.

Smelling and tasting



Does smelling help you taste foods?
How might you find out?

20

Main concept of the lesson (pages 20–21):

Smelling helps people taste foods.

Performance objective: After studying the information provided in this lesson, the children should be able to

—show that smelling helps them taste foods.

Important words: smelling, tasting.

Sample answers: I don't know. I could find out by holding my nose shut while I taste some foods.

FINDING OUT

- Close your eyes.
- Hold your nose shut.
- Try guessing what some foods are by tasting them.



Might smelling the foods help you taste them? Try finding out.

Teaching helps for "Finding Out":

Materials needed: pieces of peeled apple, potato and onion.

Processes used: observing, communicating, predicting.

Sample findings: The children will most likely find that it is very hard to guess what some foods are if they cannot smell the foods as they taste them. The children may infer from this observation that smelling helps them taste foods.

Suggested discussion:

After the children have completed this "Finding Out," you might ask them these questions: Have you ever had a cold? If so, could you taste the foods you ate as well as you could taste them when you did not have the cold? If not, why not? (Sample answer: No, I could not taste the foods as well when I had the cold as when I did not have the cold. Having a cold kept me from smelling most of the foods I ate.)

Words to Know

seeing

touching

tasting

hearing

smelling

Picture to Think About



How are these children finding out
about things around them?

22

Reviewing the important words: You may wish to use the words under “Words to Know” to help the children review the important words in this unit.

Applying knowledge: You may wish to encourage the children to apply the knowledge they have gained about some of the concepts in this unit. Have the children look at the picture under

“Picture to Think About.” Then have them read the question under the picture and discuss their answer to the question.

Sample answer for “Picture to Think About”: They are finding out about things around them by seeing, by hearing, and by touching.

Questions to Answer

1. How does seeing help you find out about things?
2. How does hearing help you find out about things?
3. How does touching help you find out about things?
4. How does smelling help you find out about things?
5. How does tasting help you find out about foods?

Fun Things to Do

Draw some pictures.

Show some ways seeing
and hearing help you.

Show some ways touching, smelling,
and tasting help you.

Have a tasting party.

Taste some foods you
have never tasted before.

Suggestion for evaluation: You may wish to use the questions under "Questions to Answer" to evaluate the children's understanding of the main concepts of the unit.

Sample answers for "Questions to Answer": 1. Seeing helps me find out about the color, the size, and the shape of things. 2. Hearing helps me find out about the sounds different things make. 3. Touching helps me find out if things are hot

4. Smelling helps me find out about things such as perfume, flowers, smoke, and foods. 5. Tasting helps me find out which foods taste sweet, sour, salty, or bitter.

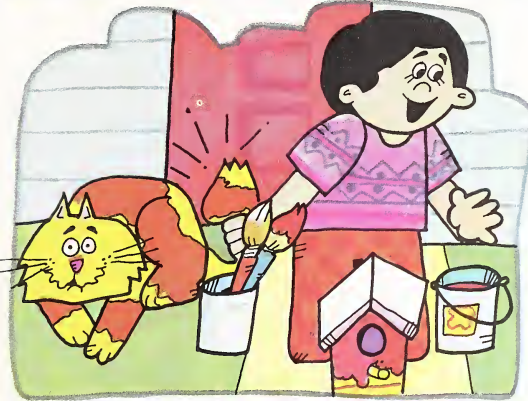
For further involvement: You may wish to use "Fun Things to Do" to involve the children in fun activities which reinforce some of the main concepts of the unit "Your Senses." You may also wish to encourage the children to make up additional

2 Living Things



Preparing for the unit: For a list of instructional materials helpful in teaching this unit, see page T11 of the Teacher's Manual. These instructional materials include general references for the teacher, books for children, and filmed or recorded materials. You may also wish to check the list

of materials needed for each "Finding Out" activity in this unit and have the children begin collecting these materials. The list of materials for each "Finding Out" activity is given under "Teaching helps for Finding Out" on pages 28, 34, 35, 41, and 43.



When did Kevin know
his brush was living?

What are some other
living things?

Introducing the unit, you may wish to have the children look at the cartoon above. Then have the children read the questions below the cartoon and discuss their answers to the questions.

Sample answers for questions below the cartoon

1 When the cat jumped.

2 Dogs, horses, trees, people.

Kinds of living things



Which of these living things are plants?¹

Which of these living things are animals?²

Main concepts of the lesson (pages 26–29):

Plants, animals, and people are living things.

Living things are different from things that are not living.

Performance objectives: After studying the information provided in this lesson, the children should be able to

—distinguish between living and nonliving things;

—list several things which are living.

Important words: living things, plants, animals.

¹ **Sample answer:** Trees, mushroom, grass, flowers.

² **Sample answer:** Opossum, butterfly, caterpillar, fish, coral, geese.

How are you different from other living things?¹



Teaching helps for the pictures above (pages 26–27): You may wish to take this opportunity to discuss the living things pictured on these pages. Ask the children where they have seen an opossum. (Sample answer: At the zoo, in the backyard.) Some children may not think of caterpillars and

butterflies as animals. Few children will know that the coral are animals. Ask the children where they have seen a mushroom. If possible show them a real mushroom, or better still, take them to a place where mushrooms are growing

¹ **Sample answer:** I can talk, I can read books.

FINDING OUT

- Find some things outside.
- Find things that are not living.
- Find things that are living.



28

Teaching helps for "Finding Out":

Materials needed: small living things, small non-living things.

Processes used: observing, comparing, communicating, classifying.

Sample findings: As your children sort out the things which they bring in, the concept of living things as differing from nonliving things will develop. The children may bring in such things as stones, weeds, buttons, seeds, sand, and cater-

pillars. Things such as seeds may pose a problem. The children may not recognize seeds as living. You may wish to ask your children, "What happens to a seed when it is planted?" (Sample answer: A plant grows.) The children will most likely see that a seed must be living in order to have a living plant grow from it. In the "Finding Out" on page 34, the children will have the opportunity to plant seeds and watch them grow. *Extending the "Finding Out":* You may wish to



Which of your things are not living?
Which of your living things are plants?
Which are animals?

29

have the children name all the living things in the classroom. They may enjoy playing a guessing game. A child should think of something in the room. Other children will ask, "Is it living or not living?" The other children will keep asking questions until the proper thing is guessed. Each time a new thing is being guessed, however, the first question should be, "Is it living or not living?"

Additional Information: The next few lessons will help the children determine some of the children's concepts of living things. You may want to ask the children what they think some of the characteristics of living things are. You can leave the answers unanswered, since the next few lessons will help the children verify their own answers.

Moving



Which things can move by themselves?¹

30

Main concept of the lesson (pages 30–31):

Living things can move by themselves.

Performance objective: After studying the information provided in this lesson, the children should be able to

—state that living things can move by themselves.

Important words: move, plant.

Teaching helps for the pictures above: The children will see from the pictures above that some

things, such as the children and the bird, can move by themselves. Other things, such as the doll, the building, and the fence, cannot. The water in the picture on the left is moving, but not by itself. Winds and tides cause the water to move. To develop this idea further, have the children fill a glass with water. The water in the glass does not move by itself.

¹ **Sample answer:** The children, the bird.



How did the plant move?¹
 What do you think made
 the plant move?²



Teaching helps for the pictures above: The flower in the pictures is closing for the night. It is responding to a change in the amount of light it is receiving. You may wish to ask the children if they know of other flowers that close up for the night.

(Sample answer, morning glory, petunia, sweet pea.)

¹ Sample answer: The flower closed up.

² Sample answer: The flower closed as it got dark outside.

Growing and changing



Which things in the pictures can grow?¹



Main concept of the lesson (pages 32–33):

Living things can grow and change

Performance objective: After studying the information provided in this lesson, the children should be able to

—list ways in which living things change as they grow

Important words: grow, living things, change

Teaching helps for the pictures above: Have you

Have them notice in what ways the adult duck differs from the ducklings. (Sample answer: Its feathers are larger. Its colour is different.) For the bottom picture, ask the children how plants change as they grow. (Sample answer: They may grow more leaves. They may grow some flowers.) Sample answer: (The questions on this page and the next refer to the pictures on both pages.) Ducks, plants, baby, boy, trees, man

Which things cannot grow?¹ Why?²
How do some living things change
as they grow?³



Teaching helps for the picture above: Your children will most likely see that the baby can grow, and so can the little boy. They may say that the father can't grow. Point out that the father can grow heavier. His hair and fingernails can also grow. His hair may change from brown to gray after some years.

¹ **Sample answer:** The table, the fence, the flower-pots, the people's clothes.

² **Sample answer:** Because these things are not living.

³ **Sample answer:** Their shape and their looks change as they grow.

FINDING OUT

- Plant many kinds of seeds.
- Take care of your plants.
- Watch them grow.



Which plants grew the most?
How did the plants change?

34

Teaching helps for "Finding Out":

Materials needed: Several kinds of seeds, milk cartons (or other containers), soil.

Processes used: observing, comparing, communicating, experimenting.

Sample findings: The children will find that the plants change in shape and get more leaves as they grow.

Additional information: You might suggest that

the children plant the seeds 3 cm deep in the soil. When the seeds sprout, use this opportunity to make the children aware of the differences among the various types of young plants. More important for this "Finding Out," however, is that the children notice the changes that occur within the same plant as it grows.

FINDING OUT



- Bring in pictures of you when you were little.
- Guess which picture belongs to each of your friends.



How did your friends grow and change?

How much did you grow?
How can you tell?

35

Teaching helps for "Finding Out":

Materials needed: photos of your second children when they were younger.

Processes used: observing, comparing, communicating.

Sample findings: Your children will find that they and their classmates have grown and changed considerably since the time when the photos were taken. The children should have fun trying to guess who is who from the photos. The children

will notice that they have all changed in size and shape. They all used to look like babies, but they are more grown up.

Extending the "Finding Out": You may want to take a photo of each of your second children at this time if you have a camera available. Take it this year you may wish to take another photo of each one. The children will enjoy seeing how they have grown and changed during the year.

New living things

Many new plants come from seeds.
Where do seeds come from?¹



Baby animals come from their
mother and father.

36



Main concept of the lesson (pages 36–37):

Living things come from other living things like themselves.

Performance objective: After studying the information provided in this lesson, the children should be able to

—discuss where new living things come from.

Important words: plants, seeds, baby, animals,

¹ **Sample answer:** From grown-up plants.

Teaching helps for the pictures above: The picture at the top right on this page can be used to show that new plants come from seeds. The picture at the lower right shows corn seeds being produced by a mature corn plant. You may wish to use the picture on the left to help your children understand that both the rooster (male) and the



Where have you seen a baby
with its mother and father?

Teaching helps for the pictures above: You may wish to use the pictures above to help the children understand that babies come from their

mother and father, just as other living things come from their parents.

Care of new living things



38

Main concept of the lesson (pages 38–39):

Some living things care for their babies.

Performance objective: After studying the information provided in this lesson, the children should be able to

—list ways in which some living things care for their young.

Important words: living things, care, babies.

Teaching hints: For the mother cat and kittens,

children see the picture at the upper left, they will most likely want to relate their experiences with a pet which had offspring. Discuss with the children how the pet cared for its babies. At the bottom left, the children will see the way that the mother duck cares for her ducklings—by keeping it warm. In the picture at the right, the mother kangaroo provides warmth, shelter, and



How do some living things care for their babies?



39

Teaching helps for the pictures above. The children will enjoy discussing all the things the parents in these pictures are doing for their babies: feeding them, dressing them warmly and playing with them. The children will want to add other things from their own store of know-

ledge—parents pat the hair babies, change them, take them for walks, etc.

Sample answer: By feeding them, by dressing them warm, by cleaning them, by playing them around.

Needs of plants



What things do plants need?¹

40

Main concept of the lesson (pages 40–41):

Plants need certain things to live and grow.

Performance objective: After studying the information provided in this lesson, the children should be able to

—state some things plants need in order to live and grow.

Important words: plants, needs, grew.

Teaching helps for the picture above: Have the

children discuss what things the children in the picture are doing for the little tree. (Sample answer: They are planting the tree in soil. They are giving water to the tree.) You may wish to ask why the tree needs these things. (Sample answer: The tree needs these things in order to grow.)

¹ **Sample answer:** Water, air, light, soil.

FINDING OUT

- ▶ Get 3 plants.
- ▶ Put labels on the plants.
- ▶ Do as the labels say.



Which plant grew best? Why?

41

Teaching helps for "Finding Out":

Materials needed: 3 plants of the same kind and size, large cardboard box without lid, paper, marker, tape.

Processes used: observing, comparing, inferring, communicating, experimenting.

Sample findings: Your children will find that the plant which received water and light grew best. They will most likely infer that this is because

water and light are things that plants need in order to grow.

Extending the "Finding Out": At the conclusion of this "Finding Out," you may wish to have your children watch over and care for the two deprived plants. They should now give the plants both water and light. After a time, the plants should revive. This is another proof that plants need certain things to grow.

Needs of animals



What things do animals need?¹

42

Main concept of the lesson (pages 42–43):

Animals need certain things to live and to grow.

Performance objective: After studying the information provided in this lesson, the children should be able to

—state some things animals need in order to live and grow.

Important words: animals, need, raise

Teaching helps for the pictures above: Ask your

children what is happening to the little birds in the pictures. (Sample answer: They are being fed.) Ask the children what else the little birds need. (Sample answer: A place to live.) Ask the children how the deer is taking care of its needs. (Sample answer: By going to the stream to drink water.)

Sample answer: Food, water, a place to live, air.

FINDING OUT

- Find some animals to raise.
- Give them what they need.



What things do your animals need?

43

Teaching helps for "Finding Out":

Materials needed: small animals (mice, hamsters, fish, birds), proper food and shelter for the animals, water

Processes used: observing, communicating, Experimenting

Sample findings: Your children will most likely enjoy taking care of their animals. Make sure that

the children are aware of the needs of the animals they have chosen to raise. You will want to stress that all the animals' needs are provided for. As a reference for the classroom, you may wish to make available a copy of the book *Small Pets for You: Guide to the Small Pet and How to Care for It* by Whitford and Cecil Lubell, Spotsborough, Ontario: McGraw-Hill Ryerson.

Your needs



44

Main concept of the lesson (pages 44–45):

Children need certain things.

Performance objective: After studying the information provided in this lesson, the children should be able to
—state several things that children need.

Important words: children, need

Teaching helps for the pictures above: Ask your children how the children shown in the pictures on this page are getting the things they need (Sample answer: By eating food, by sleeping at night, by playing and getting exercise.)



What things do children need? ¹

How do you get the things you need? ²

Teaching helps for the pictures above: The children shown in the pictures on this page are receiving basic human needs. In the top picture, an unhappy child is being consoled and comforted. You may wish to ask your children when they have needed to be consoled. In the bottom picture the two girls are sharing a happy secret

in friendship. You may wish to ask your children when they have shared a secret with a friend.

¹ **Sample answer:** Food, sleep, exercise, warm clothes, a house to live in, someone to love them, friends to play with.

² **Sample answer:** From my parents or those I live with, from my teacher, from my friends.

Words to Know

living things
need
care
grow

plants
animals
baby

mother
father
change

Picture to Think About

What things do these
living things need?



Reviewing the important words: You may wish to use the words under 'Words to Know' to help the children review the important words in this unit.
Applying knowledge: You may wish to encourage the children to apply the knowledge they have gained about some of the concepts in this unit. Have the children look at the picture under

"Picture to Think About." Then have them read the question above the picture and discuss their answer to the question.

Sample answer for "Picture to Think About":
Water, light, air, food, exercise, a place to live, friends, someone to love.

Questions to Answer

1. What are some things living things can do?
2. What do plants need to live?
3. What do animals need to live?
4. What are some things you need?

Fun Things to Do

Visit a zoo or a pet store.
Find out about the animals.
Find out what they need.

Make a scrapbook.
Put pictures of living things
in your scrapbook.
Show what the living things need.

For further involvement: You may wish to use "Fun Things to Do" to involve the children in fun activities which reinforce some of the main concepts of the unit "Living Things." You may also wish to encourage the children to make up and carry out additional activities related to this unit.

Suggestion for evaluation: You may wish to use

the questions under "Questions to Answer" to evaluate the children's understanding of the main concepts of the unit.

Sample answers for "Questions to Answer":

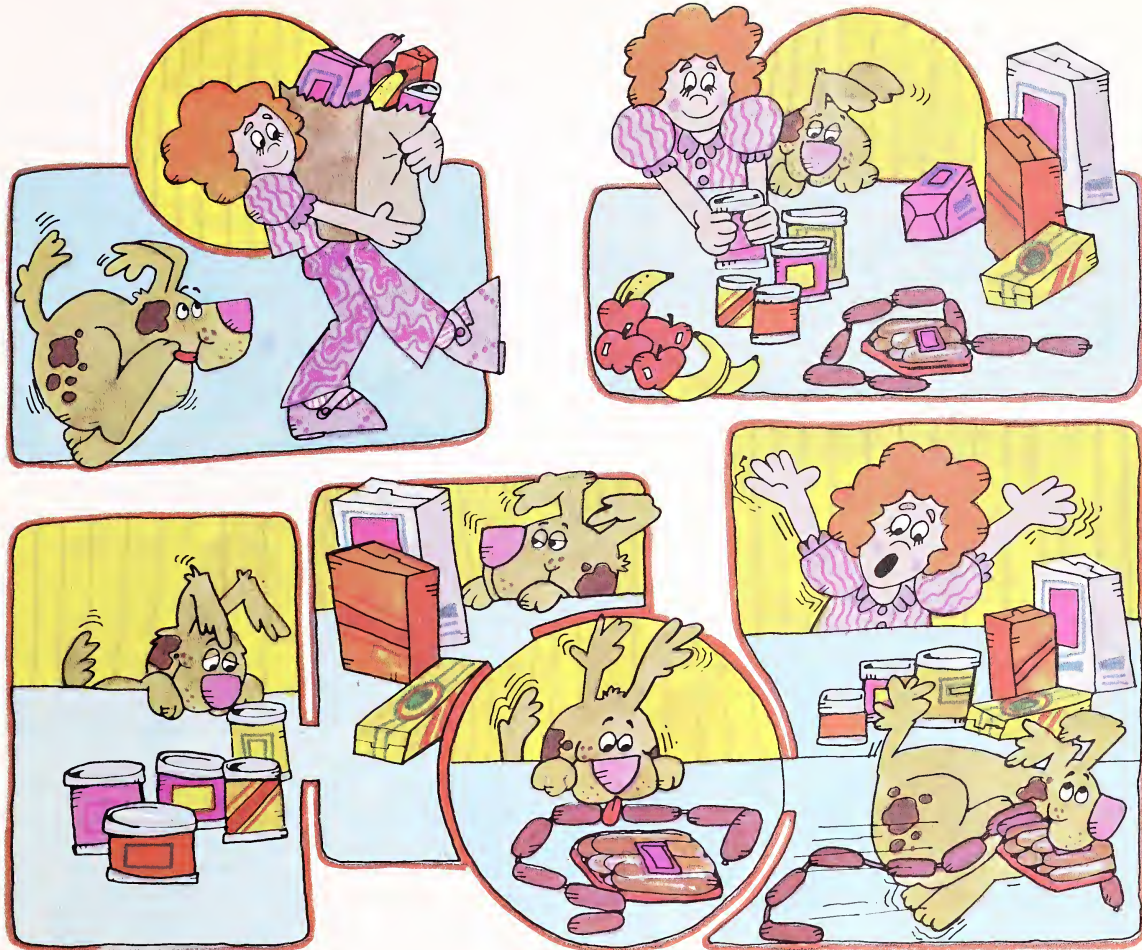
1. Move, grow, change, eat, drink. 2. Water and light. 3. Water, food, and a place to live. 4. Water, food, sleep. 5. Air, food, and a place to live.

3 Sorting



Preparing for the unit: For a list of instructional materials helpful in teaching this unit, see pages T11-T12 of the Teacher's Manual. These instructional materials include general references for the teacher, books for children, and filmed or recorded materials. You may also wish to check the

list of materials for each “Finding Out” activity in this unit and have the children begin collecting these materials. The list of materials for each “Finding Out” activity is given under “Teaching helps for Finding Out” on pages 53, 58, 59, 62, 63, 67, and 69.



How did Maria sort things?¹

What things did Happy sort?²

What things have you sorted?

Introducing the unit: You may wish to have the children look at the cartoon above. Then have the children read the questions below the cartoon and discuss their answers to the questions.

Sample answers for questions below the cartoon:

¹ She put the same kind of food in one place.

² Happy sorted out the sausages.

How things are alike



What things in the pictures are alike?¹

How are they alike?²



Main concept of the lesson (page 50):

Some things around you are alike.

Performance objective: After studying the information provided in this lesson, the children should be able to

—tell how some things are alike

Important word: alike.

Teaching helps for the pictures above: Encourage your children to find all the likenesses they can in the pictures above; e.g., in the picture at

the left, all the fruit are alike in that they are all pumpkins. Besides, some of the pumpkins are alike in size; others are alike in shape. The same can be said for the things in the pictures on the right. Some of the masks are alike and some of the cookies are alike.

¹ **Sample answer:** The pumpkins are alike; some of the cookies are alike; some of the masks are alike.

² **Sample answer:** Their colour and shape are alike.

How things are different



What things in the pictures are different?

How are they different?

51

Main concept of the lesson (page 51):

Some things around you are different.

Performance objective: After studying the information provided in this lesson, the children should be able to

—tell how some things are different

Important word: different.

Teaching helps for the pictures above: Besides noting the differences in colour, shape, and size

of the things in each picture, encourage your children to notice that some of the things differ in their use, taste, and texture and in many other ways.

Sample answer: The doll, the block, the crayon, the marble, the nuts, the bolts, the canoes.

Sample answer: They are of different colours, shapes, sizes, uses, textures and hardness.

Sorting by colour

What colours do you see in the picture?¹



How have these things been sorted?²



Main concept of the lesson (pages 52-53):

Things can be sorted by colour.

Performance objective: After studying the information provided in this lesson, the children should be able to

—sort things by colour.

Important words: colour, sort.

Teaching helps for the pictures above: Have the

children make up a story of a monochromatic character (of only one colour), such as “The Jolly Green Giant” or “The Really Red Rooster.” Have the children illustrate their story in the appropriate colour.

¹ **Sample answer:** Red, blue, green.

² **Sample answer:** By colour.

FINDING OUT

- ▶ Find some things of different colours.
- ▶ Sort them by their colour.

What things around you are sorted by colour?¹



53

Teaching helps for “Finding Out”:

Materials needed: objects of different colours.

Processes used: observing, communicating, comparing, classifying.

¹ *Sample answer:* Crayons, cardboard, chalk.
Extending the “Finding Out”: Have the children do a sorting exercise by naming everything blue in the classroom, then everything green, etc.

Sorting by size



Which thing in each picture is big?¹

Which thing in each picture is little?²

54

Main concept of the lesson (pages 54–55):

Things can be sorted by size.

Performance objective: After studying the information provided in this lesson, the children should be able to

—sort things by size

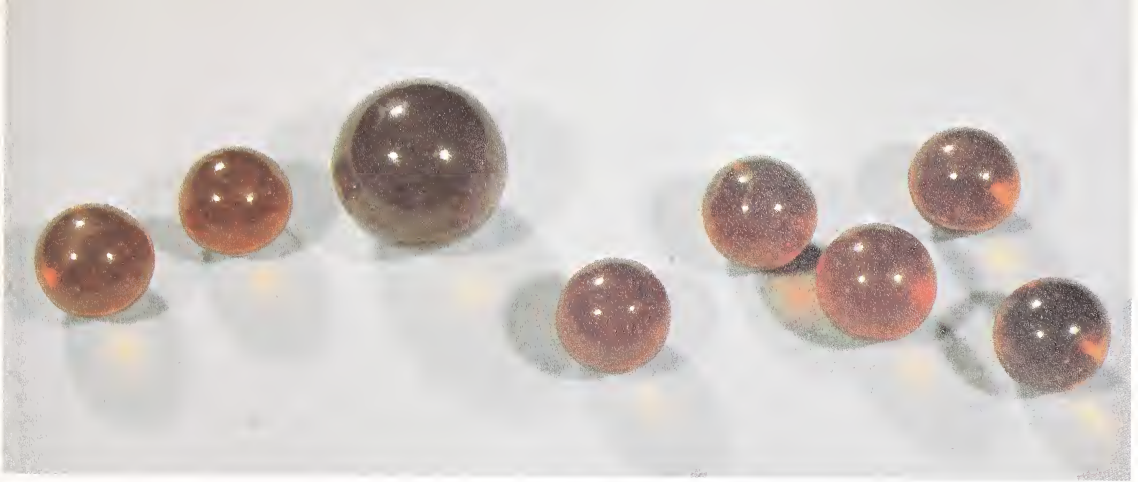
Important words: size, sort.

Teaching helps for the picture above: In case your children are curious about what kind of eggs are

in the picture on the left, you may want to tell them that the larger egg is an ostrich egg. The smaller egg is a hummingbird egg.

¹ **Sample answer:** The ostrich egg; the truck; the first zebra; the third marble; the first, second, fourth, and fifth elephants.

² **Sample answer:** The hummingbird egg; the ears of the train; the second zebra; all but the third marble; the middle elephant.



How might you sort these things?¹

55

Teaching helps for the pictures above: The question above gives you an opportunity to encourage your children to find other ways to sort things in the pictures above. They might wish to sort the

living things from the nonliving things. They might also sort things by colour.

Sample answer. By size, by colour, by whether they are living or not.

Sorting by shape



56

Main concept of the lesson (pages 56–59):

Things can be sorted by shape.

Performance objective: After studying the information provided in this lesson, the children should be able to

—sort things by shape.

Important words: shape, sort, different.

Suggested discussion: The names of some shapes, such as *square* and *triangle*, may be difficult reading words. Because of this, the names of

these shapes can be used, but they are not printed as words in the lesson. *Square*, *triangle*, *circle*, or the adjectives referring to them (*square*, *triangular*, *round*) are shown only as picture words on page 58. You may wish to add others, such as *rectangle*, as the need arises. You may also wish to discuss the peculiarities of each shape to aid the children in distinguishing one shape from another.



Find the different shapes
in these pictures.

Find the different shapes
in your room.



Teaching helps for the pictures on these pages: Your children will most likely be familiar with some toys that use shapes, such as jigsaw puzzles or building blocks. You may wish to capitalize on

that as much as possible, even if they are children bring in such toys. Have them find all the shapes they can in the pictures. Then, have them find many shapes in the classroom.

FINDING OUT

- ▶ Go outside.
- ▶ Find something ○.
- ▶ Find something □.
- ▶ Find something △.



What other shapes
can you find outside?

Teaching helps for "Finding Out":

Materials needed: none.

Processes used: observing, comparing, communicating.

Sample findings: Besides those mentioned in the "Finding Out," your children may find things outside that are oval, elliptical, or rectangular.

They will probably say "shaped like an egg" for oval and "shaped like a box" for rectangular. *Additional information:* Your children may enjoy trying to find the hidden shapes in buildings, such as triangles, rectangles, squares. As they become more observant, the possibilities are limitless.

FINDING OUT

- Cut out shapes from coloured paper.
- Put the cutouts in a pile.
- Sort them by shape.



How else can you sort the cutouts? ¹Try it.

59

Teaching helps for "Finding Out":

Materials needed: coloured paper, scissors, stencils of shapes.

Processes used: observing, classifying, communicating, comparing.

¹ **Sample answer:** By colour, by size.

Sorting by feeling



Which things do you think feel smooth?¹

Which things feel rough?²

60

Main concept of the lesson (pages 60–63):

Things can be sorted by feeling them.

Performance objective: After studying the information provided in this lesson, the children should be able to

—sort things by feeling them

Important words: smooth, rough, feel, soft, hard, sort.

Suggested discussion: Your pupils will find that

be hard or soft. Ask them to feel the things around them to tell you other characteristics they can find out about something by feeling. (Sample answer: It feels like satin. It feels like paper. It feels hairy.) Have the children describe how they think something feels before they actually feel it. Check with them to see if appearances can be deceiving in some cases.

¹ **Sample answer:** The puppies, the girl's hair



There are other ways to sort
things by feeling them.
How might you sort these things? ¹

¹ **Sample answer:** By telling which are hard or soft and which are rough or smooth.

FINDING OUT

- Bring in some small things.
- Tell which things feel rough.
- Tell which things feel smooth.



How might you sort these things? ¹

62

Teaching helps for "Finding Out".

Materials needed: small rough things, small smooth things.

Processes used: observing, comparing, classifying, communicating.

¹ Sample answer: By feeling them.

FINDING OUT

- ▶ Find some things that are hard.
- ▶ Find some things that are soft.
- ▶ Close your eyes.
- ▶ Sort the things you found.



How did you sort your things?

63

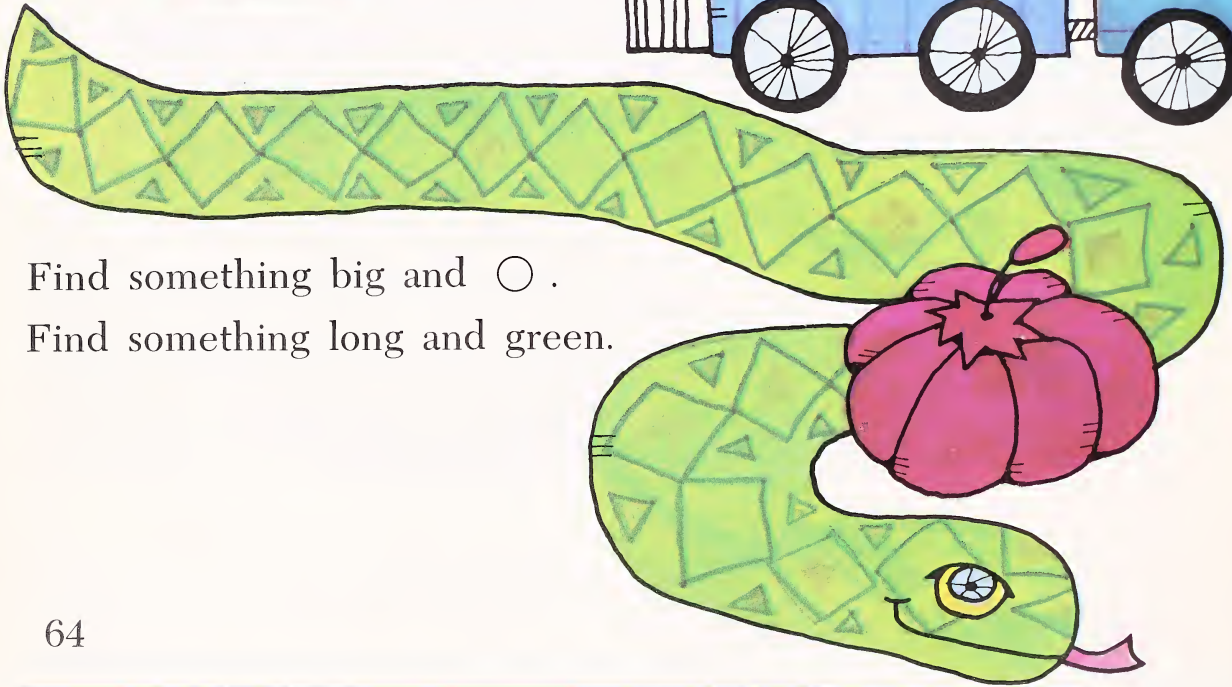
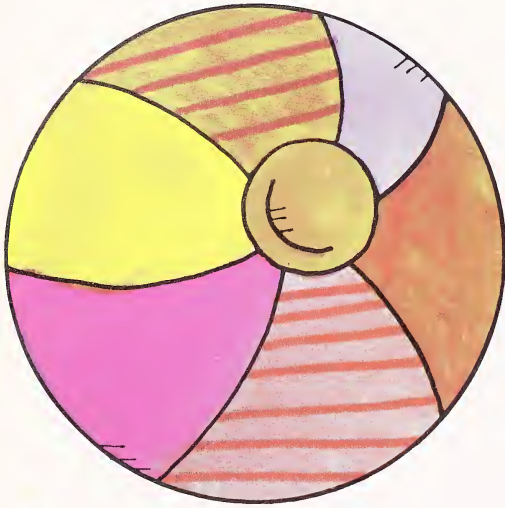
Teaching helps for "Finding Out"

Materials needed: Small, hard things, small, soft things

Processes used: observing, comparing, classify, fine communication

Sample answer: By feeling them

Sorting by two differences



Find something big and ○ .
Find something long and green.

Main concept of the lesson (pages 64–65):

Things can be sorted by noting two characteristics which they have.

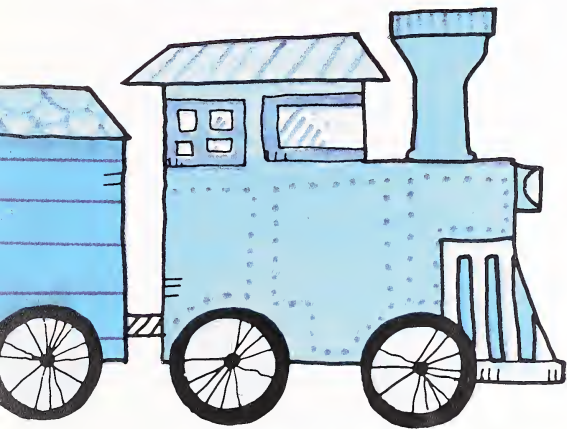
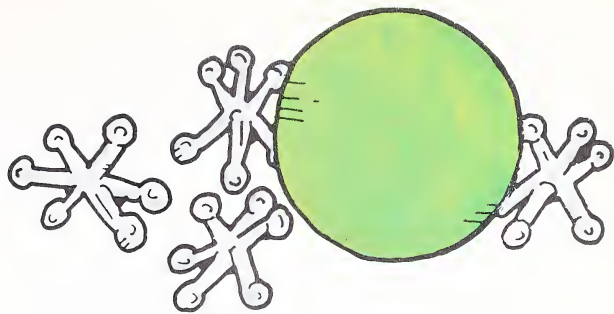
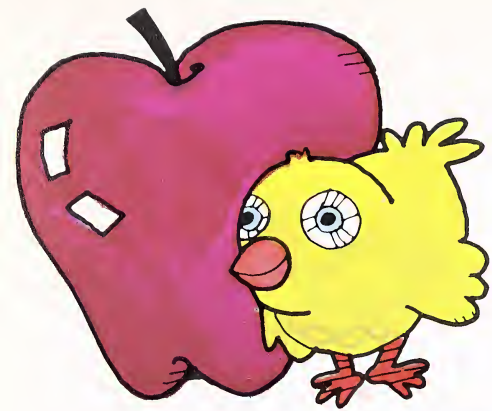
Performance objective: After studying the information provided in this lesson, the children should be able to

—sort things by considering two characteristics in the things being sorted

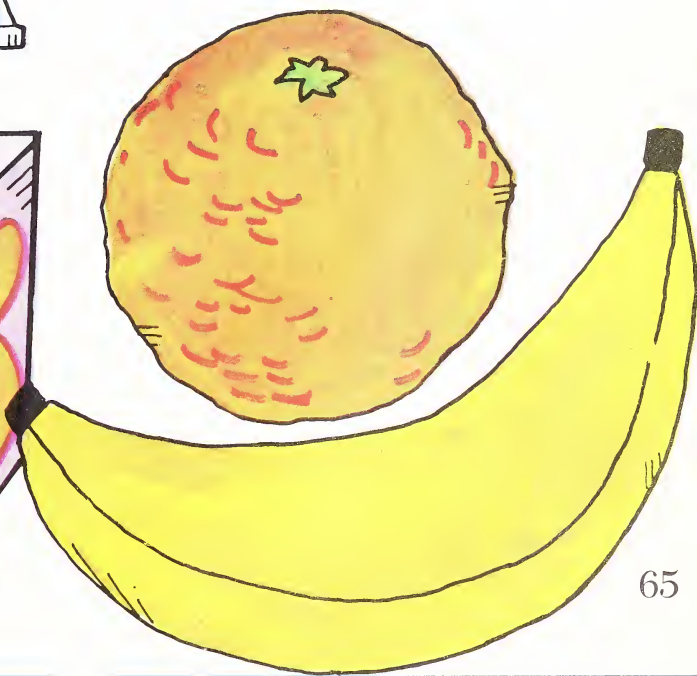
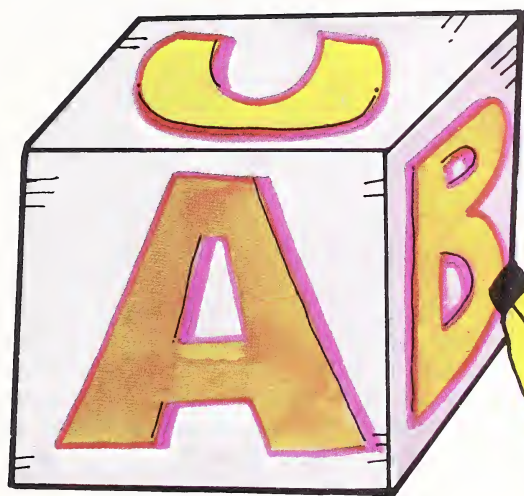
Important words: differences, sort, hard.

Teaching helps for the pictures above: Your chil-

dren may pick the multicoloured ball for something big and round. They may also choose the orange. The snake is long and green. The block is hard and square. The chicken is little and yellow. Let the children point out two characteristics that distinguish one thing from another in the pictures on these pages. Afterward let them extend their sorting by two characteristics to the things in the classroom or outside.



Find something hard and ☐ .
Find something little and yellow.
Sort these things in other ways.
Use two differences.



Suggested activity: Have the children collect things from around the room. Let each child sort things for two characteristics. They can make piles of short yellow things, little green things,

etc. The children will find that things may be able to be shifted from one pile to another as they are sorted for different characteristics.

Sorting for selling



How have these things been sorted for selling?¹



66

Main concept of the lesson (pages 66–67):

Things are sorted for selling.

Performance objective: After studying the information provided in this lesson, the children should be able to

—explain how things are sorted for selling.

Important words: sort, sell, store.

Teaching helps for the pictures above: You may wish to ask your children if they have ever gone to a supermarket. Discuss with the children how

things are sorted in a supermarket. Ask them why they think things are sorted in that way. (Sample answer: Because it's easier to find the things you want to buy.)

¹ **Sample answer:** All the soups are in one place, all the cookies are in another place, all the bread is in another place. Also, all the bikes are together, and other toys are with toys of the same kind.

FINDING OUT

- Bring in some little toys.
- Make a toy store.
- Sort the toys.



How did you sort the toys?¹

67

Teaching helps for "Finding Out":

Materials needed: small toys.

Processes used: observing, comparing, classifying, communicating.

¹ *Sample answer:* We put all the cars together, all the dolls together, all the games together.

Extending the "Finding Out": After your children

have sorted the toys according to kind, tell them to sort the toys in other ways. They might sort them according to colour, to size, to price, etc. Ask them why they are not often sorted in these ways at the store. (Sample answer: Because it helps you more to find the things sorted by the kind of things they are.)

Sorting at home



How are these people
sorting their food?¹

What things do you sort
at home?²

68

Main concept of the lesson (pages 68–69):

At home things are often sorted.

Performance objective: After studying the information provided in this lesson, the children should be able to

—explain how things are sorted at home.

Important word: sort.

¹ **Sample answer:** They are putting the things that need to be kept cold in the refrigerator and the canned things on the shelf.

² **Sample answer:** My clothes, my toys, the groceries.

FINDING OUT

- ▶ Put everyone's shoes in a pile.
 - ▶ Try to find your shoes.
-
- ▶ Sort the shoes in some way.
 - ▶ Try to find your shoes now.



How does sorting help you find things?¹

69

Teaching helps for "Finding Out":

Materials needed: shoes.

Processes used: observing, comparing, classifying, communicating, interpreting data.

¹ *Sample answer:* I can find things faster when they are sorted.

Additional information: Have the children notice how things are sorted in the classroom. Paper is in one place, books in another. Ask the children if they would have sorted things differently and why. Let them try their way.

Words to Know

alike
different
differences
sort

colour
shape
feel
hard

soft
rough
smooth

Picture to Think About

How is this child
sorting things?¹

How is sorting helpful?²



70

Reviewing the important words: You may wish to use the words under “Words to Know” to help the children review the important words in this unit. **Applying knowledge:** You may wish to encourage the children to apply the knowledge they have gained about some of the concepts in this unit. Have the children look at the picture under “Pic-

ture to Think About.” Then have them read the questions beside the picture and discuss their answers to the questions.

Sample answers for “Picture to Think About”:
¹ The child is putting all the books together; then she’s going to put the toys together. ² It helps you find things more easily.

Questions to Answer

1. What are some different ways to sort things?
2. When have you had to sort things?
3. How has sorting helped you?

Fun Things to Do

Collect some buttons or other things.
Sort them in many ways.

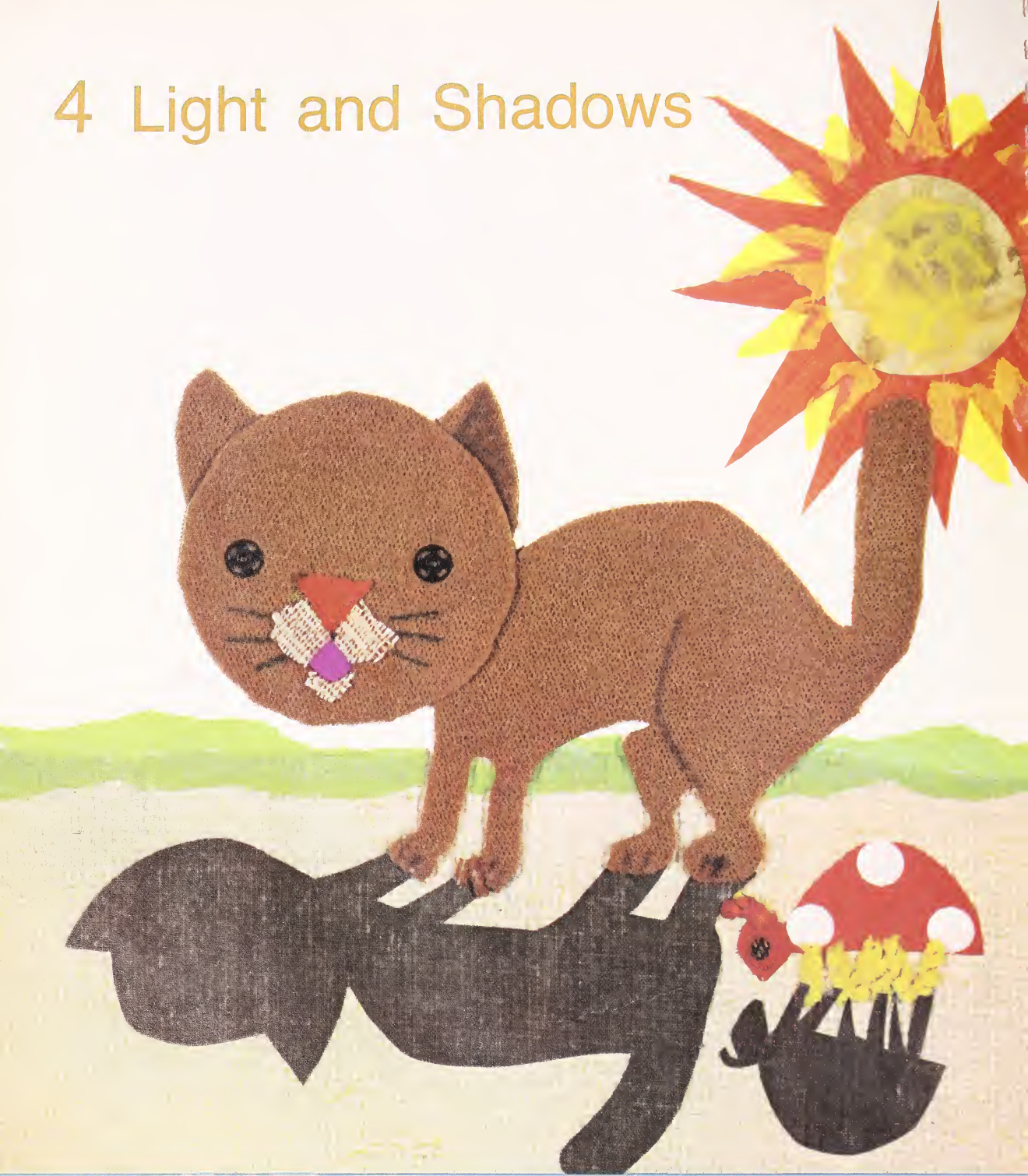
Cut out some pictures of things
to eat and drink.
Make a grocery store.
Sort the things to sell.

Suggestion for evaluation: You may wish to use the questions under “Questions to Answer” to evaluate the children’s understanding of the main concepts of the unit.

Sample answers for “Questions to Answer”: 1. By colour, by size, by shape, by kind. 2. When I put my toys away and after we buy things at the store. 3. Sorting makes it very easy to find things.

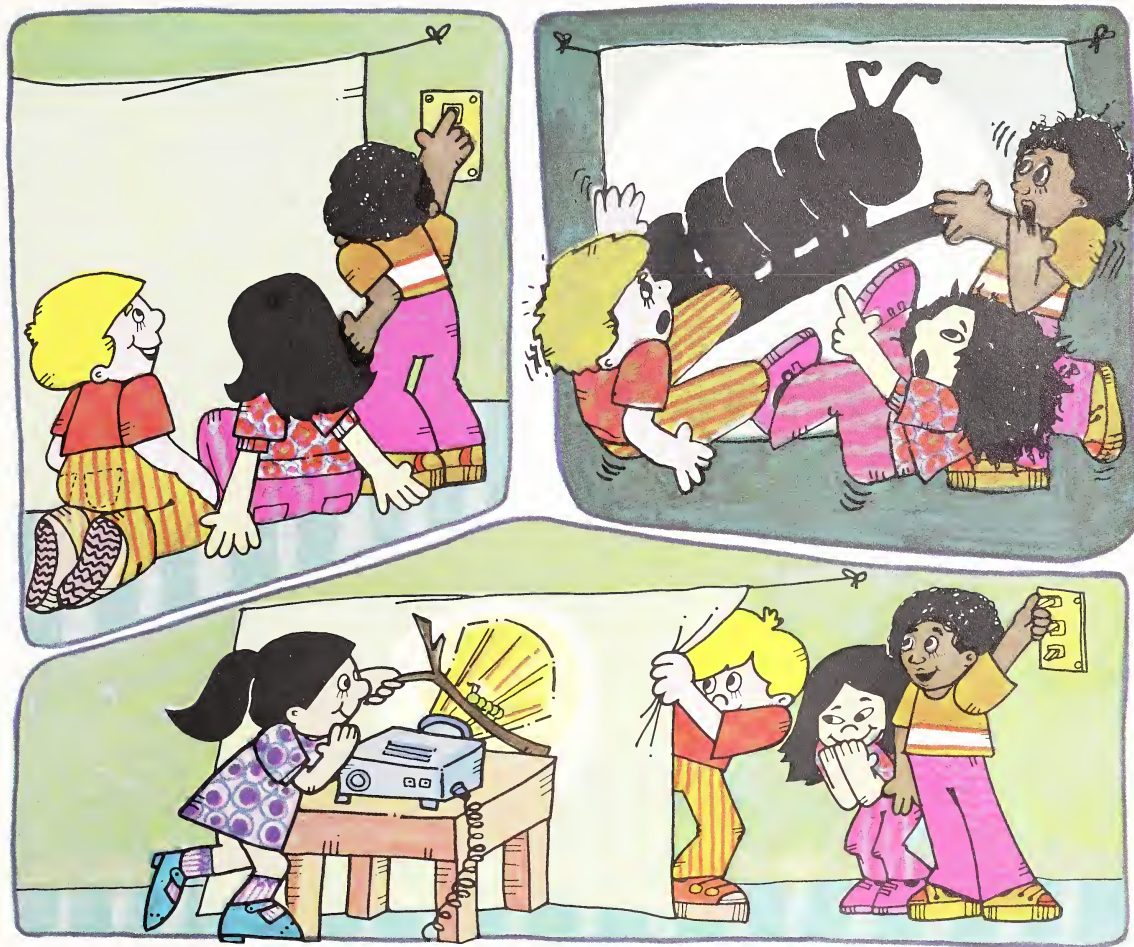
For further involvement: You may wish to use “Fun Things to Do” to involve the children in fun activities that reinforce some of the main concepts of the unit “Sorting.” You may also wish to encourage your children to make up and carry out many additional activities related to this unit.

4 Light and Shadows



Preparing for the unit: For a list of instructional materials helpful in teaching this unit, see page T12 of the Teacher's Manual. These instructional materials include general references for the teacher, books for children, and filmed or recorded materials. You may also wish to check

the list of materials needed for each "Finding Out" activity in this unit and have the children begin collecting these materials. The list of materials for each "Finding Out" activity is given under "Teaching helps for Finding Out" on pages 77, 78, 79, 81, 84, 85, 87, 89, 91, and 93.



Why did the bug look big?¹

When do you make a shadow?²

73

Introducing the unit: You may wish to have the children look at the cartoon above. Then have the children read the questions below the cartoon and discuss their answers to the questions.

Sample answers for questions below the cartoon:

¹ Because it was a shadow

² When I stand near a light.

Light



74

Main concept of the lesson (pages 74–75):

Light comes from many things.

Performance objective: After studying the information provided in this lesson, the children should be able to

—list several things from which light comes.

Important word: light.

Suggested activity: Ask the children to look around outside class during the day or night to find some other sources of light besides those shown in the pictures or those mentioned in class. (Sample findings: Camera flashbulb, electric sign, TV set, refrigerator light, car lights.)



Where is the light coming from?¹
What other things give you light?²

Suggested activity: Light is a very important part of everyone's life. This is evidenced by the fact that the word "light" appears often as a part of other words. Your children may enjoy playing a game in which they think of as many words as they can that have "light" in them. (Sample

answer: Lightning, lighter, lighthouse, traffic light, lightning bug, green light, red light.)

¹ **Sample answer:** From the bulb, the candles, the fireworks, the sun, the fire.

² **Sample answer:** The stars, a flashlight, a match.

Shadows



Find the shadows.
How do you think
shadows are made?¹

76

Main concept of the lesson (pages 76–79):

Shadows are made when something blocks the light partially.

Performance objectives: After studying the information provided in this lesson, the children should be able to

—show how shadows are made;

—tell which two things are needed to make a shadow;

—show how shadows can be changed;

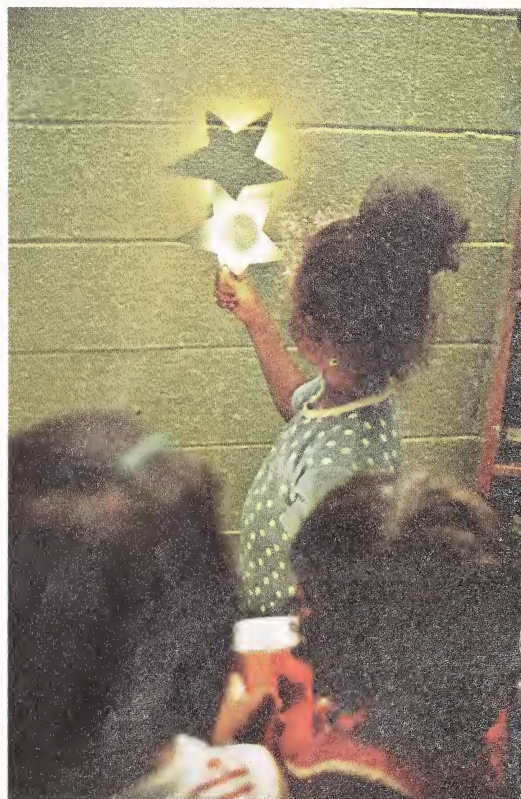
—identify an object by the shadow it makes.

Important words: shadows, light.

¹ **Sample answer:** Shadows are made when something gets in the way of the light.

FINDING OUT

- ▶ Cut some things out of paper.
- ▶ Put each thing in front of a light.



What happened when you stopped some of the light?

Can you make a shadow in the dark? Try it.

Teaching helps for "Finding Out":

Materials needed: light source, heavy paper, stencils, pencil, scissors.

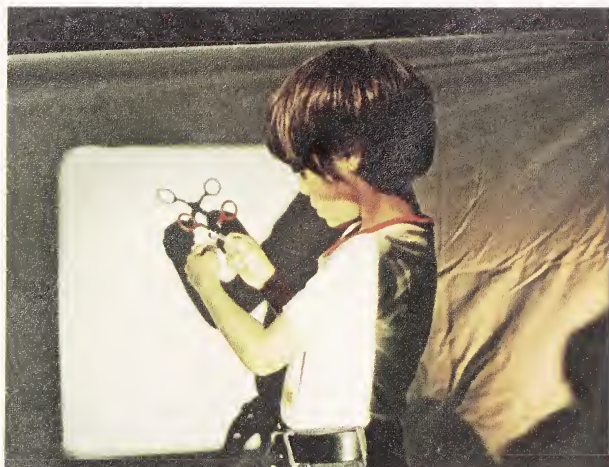
Processes used: observing, inferring, communicating, using spatial relationships.

Sample findings: The children will find that whenever something blocks some of the light, a shadow is made. They will also discover that when it is totally dark, shadows cannot be made. They may notice that, when it is partially dark, faint shadows

can be made. This is because some light is being given off, making it possible for faint shadows to be made.

Extending the "Finding Out": You may wish to have the children experiment with different kinds of light sources to find out which kind makes better shadows. Have them try an unglazed bulb, a glazed bulb, a fluorescent light, a candle, and any others they may think of.

FINDING OUT



- ▶ Have your friends make shadows.

How can you tell what is making each shadow?



Teaching helps for “Finding Out”:

Materials needed: light source, opaque objects, sheet (or anything that can be used as a screen).

Processes used: observing, communicating, using spatial relationships.

Sample findings: The children will most likely be able to identify any object held behind a sheet, screen, or paper by the shadow it casts. The light source should also be behind the sheet, screen, or paper.

FINDING OUT

- Put something close to a light.
- Look at its shadow.
- Now move it away from the light.



How did the shadow change?

79

Teaching helps for “Finding Out”:

Materials needed: light source, opaque objects, screen.

Processes used: observing, experimenting, communicating, using spatial relationships.

Sample findings: The children will notice that shadows change according to their proximity to

the light source. When the children hold any object close to the light source, the shadow cast is large and oftentimes fuzzy. When an object is held farther from the light source, its shadow is sharper and smaller. The children may wish to experiment to find the best place to hold the object in order to obtain the sharpest shadow.

Moving shadows



What things can your shadow do? Why?¹

80

Main concept of the lesson (pages 80–81):

Your shadow moves as you move.

Performance objective: After studying the information provided in this lesson, the children should be able to

—show that a person's shadow moves as the person moves.

Important word: shadow.

¹ **Sample answer:** Anything I can do, because it moves with me.

FINDING OUT

- Try to step on someone's shadow.



What games can you play with shadows? ¹

81

Teaching helps for "Finding Out":

Materials needed: none.

Processes used: observing, communicating, using spatial relationships.

Sample findings: The children will think of many games to play with shadows, once they try out

those pictured on this page. Let them tell you games with shadows they already know. They will most likely enjoy creating unusual shadows like the one in the picture on the right.

¹ *Sample answer:* "Tagging your shadow," making funny pictures, making monsters.

Finding the light



Which way is the light coming from?¹



Main concept of the lesson (pages 82–85):

A person can tell which direction the light is coming from by studying the shadows which have been cast.

Performance objective: After studying the information provided in this lesson, the children should be able to

—identify the direction from which light is coming by looking at the shadows cast by the

light and noticing the direction of the shadows which are formed.

Important word: light.

¹ **Sample answer:** In the top picture, the light is coming from the left; in the bottom picture, it is coming from the right. (If the children have not yet mastered “left” and “right,” they will most likely say “from here” and point to the direction from which the light is coming.)



How can you tell where the light
is coming from?¹

83

Teaching helps for the pictures above: The pictures on this page provide the children an excellent opportunity to make a scientific observation, a skill which will be helpful as they advance in the study of science. In the picture on the left, the sunlight is striking the children from some-

where at the lower left. On the right, at the top, the sun is directly to the right. On the right, at the bottom, the sun is coming from the upper right-hand corner.

¹ Sample answer: You can tell by looking at the shadows.

FINDING OUT

- Show where the missing shadow should be.



How did you know where the shadow should be?¹

84

Teaching helps for "Finding Out":

Materials needed: none.

Processes used: observing, inferring, communicating, using spatial relationships.

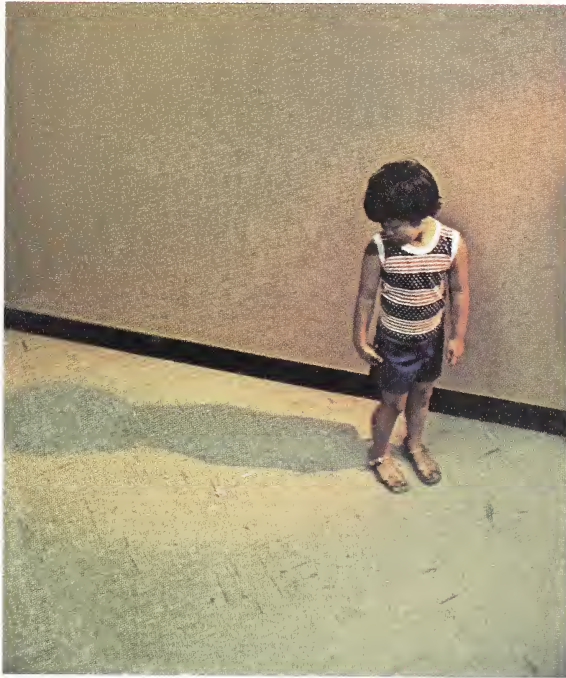
Sample findings: The children will most likely be able to visualize where the shadow from an object should be, given the shadow of the object beside it. They should be able to tell you that the light in the picture on the left is coming from the front. The shadow of the snake would be behind the

snake, next to the doll. In the picture on the right, the light is coming from the back and to the left. The doll's shadow would be diagonally to the front, and to the right. This is a two-step problem. The children may wish to decide first where the light is coming from, using as a guide the existing shadow and then deducing where the other shadow should be.

¹ *Sample answer:* The shadow of the other thing in the box helped me to know.

FINDING OUT

- Walk under a light.
- Watch your shadow.



How did your shadow move?
Why did your shadow move?

85

Teaching helps for “Finding Out”:

Materials needed: overhead light (not fluorescent).

Processes used: observing, inferring, communicating, using spatial relationships.

Sample findings: The children will find that as they walk toward an overhead light, their shadows are behind them. As they stand under the light, their shadows surround their feet. As they walk

away from the light, their shadows are in front of them. The children's shadows move because the light is in a different position in relation to them. The children may approach the problem of why their shadows move from the standpoint that they are moving. Try, by means of questioning, to get them to solve the problem by discussing how the light changes in regard to them.

Shadows in the morning



The sun is in the east
in the early morning.

How can shadows help
the girls find the east?¹

86

Main concepts of the lesson (pages 86–87):

The sun is in the east in the early morning.
When a shadow is behind you in the morning, you
are facing east.

Performance objectives: After studying the information provided in this lesson, the children should be able to

—find east by looking at their shadows in the early morning.

—find east by finding the sun in the early morning.

Important words: sun, east, morning, shadows.

Sample answer: When their shadows are behind them in the early morning, the girls are facing east.

FINDING OUT

- Go outside early in the morning.
- Face the east.
- Face the other way.
- Find your shadow each time.



Where is your shadow when you face the east in the morning?

87

Teaching helps for “Finding Out”:

Materials needed: none.

Processes used: observing, inferring, communicating, using spatial relationships.

Sample findings: The children will find that when they face east in the morning, their shadows are behind them.

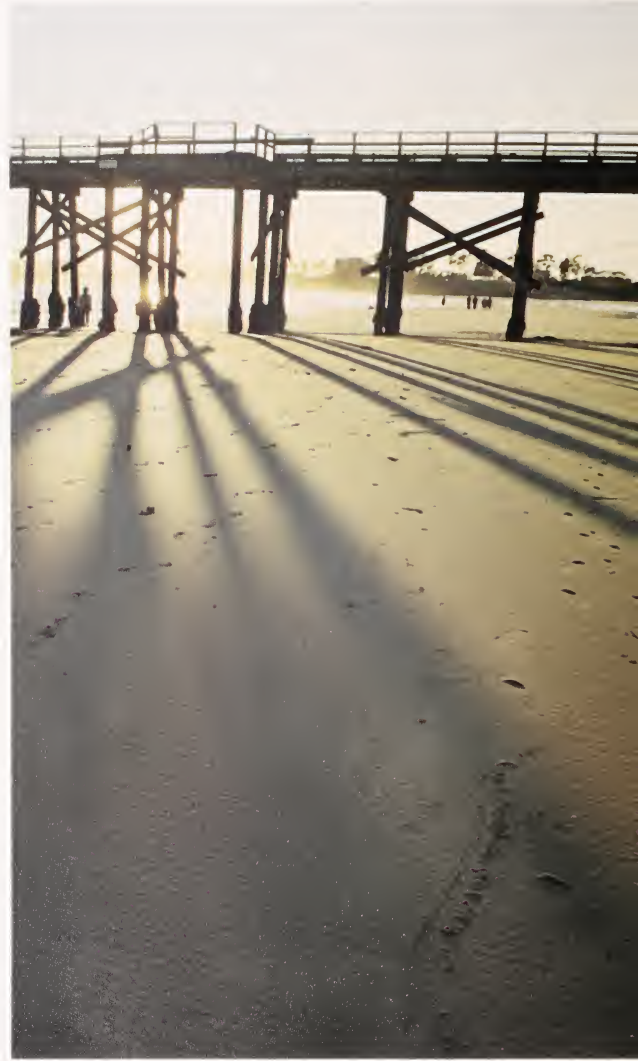
Extending the “Finding Out”: You may wish to take the children to a side of the building facing a direction other than the one they were facing when doing the “Finding Out.” See if they can still orient themselves using their shadows and the sun.

Shadows in the afternoon

The sun is in the west
in the late afternoon.



How can shadows help
these people find the west?¹



Main concepts of the lesson (pages 88–89):

The sun is in the west in the late afternoon.
When a shadow is behind you in the afternoon,
you are facing west.

Performance objectives: After studying the information provided in this lesson, the children should be able to

—find west by looking at their shadow in the late afternoon;

—find west by finding the sun in the late afternoon.

Important words: sun, west, late afternoon, shadows.

¹ **Sample answer:** These people can look to see where their shadows are in the late afternoon. When their shadows are behind them they are facing west.

FINDING OUT

- Go outside in the late afternoon.
- Face the west.
- Have a friend face the east.



Which way do shadows point
in the afternoon?

89

Teaching helps for "Finding Out":

Materials needed: none.

Processes used: observing, communicating, using spatial relationships.

Sample findings: The children will find that their shadows point to the east in the afternoon.

Extending the "Finding Out": Play a game prompted by this children's song:

Little Sally Ann,
Sitting in the sand.

Chorus: Rise, Sally, rise,
Wipe your eyes,
Turn to the east.
Turn to the west.
Turn to the one that
you love best.
(For the boys, say:
Little Steven Bill,
Sitting on a hill,
Chorus: substitute "Steven.")

Shadows at noon



Why are shadows small at noon?¹

90

Main concept of the lesson (pages 90–91):

Shadows at noon are small.

Performance objective: After studying the information provided in this lesson, the children should be able to

—tell that it is around noon by looking at shadows.

Important words: shadows, noon.

Suggested activity: After discussing with the children the picture on page 90, you may wish to experiment with a small, nonfluorescent lamp.

Darken the area except for the small lamp placed overhead. Have the children make shadows with small objects. Have them notice the size and location of the shadows. Later have the children place the lamp to the right of the objects, then to the left—noting the change in the size and location of the shadows as the light changes.

¹ **Sample answer:** Because the sun is right overhead.

FINDING OUT

- Make a shadow outside or by a window.
- Mark the shadow every hour.



What made the shadow move?
How is the sun like a clock?¹

91

Teaching helps for "Finding Out":

Materials needed: cardboard, modeling clay, pencil, marker.

Processes used: observing, inferring, comparing, communicating.

Sample findings: The children will notice that the shadow of the pencil moves as the position of the sun in the sky seems to change.

Additional information: Although the children will notice that the position of the sun seems to change during the day, be sure that you do not stress that fact, because the earth changes its position in relation to the sun, not the other way around.

¹ *Sample answer:* Because it seems to move during the day just as a clock does.

Changing shadows



What happened to the shadows?¹



Main concept of the lesson (pages 92–93):

Shadows change in size, shape, and position during the day.

Performance objectives: After studying the information provided in this lesson, the children should be able to

—state how their shadows change during the day;
—state why their shadows change during the day.

Important words: shadows, change.

¹ Sample answer: The shadows changed their place, their size, and their shape.

FINDING OUT

- ▶ Draw a shadow in the early morning.
- ▶ Draw the shadow of the same thing at noon.
- ▶ Draw the shadow in the afternoon.



How did the shadows change?

93

Teaching helps for “Finding Out”:

Materials needed: none.

Processes used: observing, comparing, communicating, using spatial relationships.

Sample findings: By tracing the outline of the shadows, the children will become very much aware of the fact that shadows change in size,

shape, and position during the day. The children will notice the long, lanky shadows in the early morning. At noon, the shadows will be short and fat. Later in the afternoon, the shadows will be long and lanky again but on the side opposite the morning shadows.

Words to Know

light
shadows
sun

morning
noon
afternoon

east
west

Picture to Think About



What time of day
is it in the picture?¹
How can you tell?²

94

Reviewing the important words: You may wish to use the words under "Words to Know" to help the children review the important words in this unit.

Applying knowledge: You may wish to encourage the children to apply the knowledge they have gained about some of the concepts in this unit. Have the children look at the picture under "Pic-

ture to Think About." Then have them read the questions under the picture and discuss their answers to the questions.

Sample answers for "Picture to Think About":

¹ The time is about noon. ² I can tell because the shadows are small and right under the balloons.

Questions to Answer

1. What things give you light?
2. How can you make a shadow?
3. How can your shadow help you find the east and the west?
4. How can your shadow help you tell time?

Fun Things to Do

Draw a picture from a shadow.
Colour it just one colour.

Make funny shadows on the wall.
Have a shadow show.

Suggestion for evaluation: You may wish to use the questions under "Questions to Answer" to evaluate the children's understanding of the main concepts of the unit.

Sample answers for "Questions to Answer":
1. Lamps, flashlights, the sun. 2. I can put something in front of a light. 3. If my shadow is behind me in the morning, I am facing east. If my shadow is behind me in the afternoon, I am facing west.

4. When shadows are very short, it is about noon. When shadows are very long, it is early morning or late afternoon.

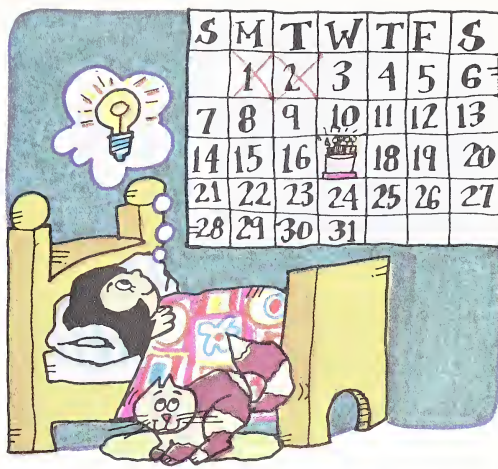
For further involvement: You may wish to use "Fun Things to Do" to involve the children in fun activities which reinforce some of the main concepts of the unit "Light and Shadows." Encourage the children to make up activities, such as shadow puppetry, related to this unit.

5 Time



Preparing for the unit: For a list of instructional materials helpful in teaching this unit, see page T12 of the Teacher's Manual. These instructional materials include general references for the teacher, books for children, and filmed or recorded materials. You may also wish to check the

list of materials needed for each "Finding Out" activity in this unit and have the children begin collecting these materials. The list of materials for each "Finding Out" activity is given under "Teaching helps for Finding Out" on pages 101, 103, 105, 111, and 116-117.



Why did Cindy want time to go by fast?¹

When have you wanted time to go by fast?²

Introducing the unit: You may wish to have the children look at the cartoon above. Then have the children read the questions below the cartoon and discuss their answers to the questions.

Sample answers for questions below the cartoon:

¹ Because she wanted her birthday to come sooner.

² When I've been waiting to go to the circus.

A day



From morning to morning
is one whole day.

98

Main concepts of the lesson (pages 98-99):

A day can be the time from one morning to the next.

A day can be the time from one afternoon to the next.

Performance objective: After studying the information provided in this lesson, the children should be able to

—explain what a day is.

Important words: morning, day, afternoon.

Teaching helps for the pictures above: You may wish to point out that the little girl in the pictures above is eating breakfast on two successive days. Bring out that a day has passed between the first and second picture. Have the children tell what they had for breakfast yesterday and today. Ask them how long a time it was from the time they ate breakfast yesterday until the time



From afternoon to afternoon
is one whole day.

What other times can be used
to mark one whole day?¹



99

they ate breakfast today. (Sample answer: A day.) Take the same approach for afternoon and night.

The idea that time is a measurable period during which something occurs or continues is developed in this lesson and the succeeding ones. An effort is made to consider the concept of time

from a child's point of view, while at the same time developing as complete an appreciation of the meaning of time as the child is capable of understanding.

¹ **Sample answer:** From lunchtime to lunchtime, from suppertime to suppertime, from bedtime to bedtime.

Daytime and nighttime



Daytime and nighttime are parts of a day.

What things do you do at each of these times?¹

100



Main concept of the lesson (pages 100–101):

Daytime and nighttime are parts of a day.

Performance objective: After studying the information provided in this lesson, the children should be able to

—explain that daytime and nighttime are parts of a day.

Important words: daytime, nighttime.

Teaching helps for the pictures above: This lesson is meant to introduce the idea that nighttime is also part of a day. The reason why a day is divided into daytime and nighttime is not explained here. The idea of the earth rotating on its axis causing night and day is covered in later grade levels.

¹ Sample answer: During daytime I play and go to school. At nighttime I eat supper and go to sleep.

FINDING OUT



- Put your pictures in order of time.

- Draw pictures of things you do every day.



When do you do these things every day?

101

Teaching helps for "Finding Out":

Materials needed: paper, crayons.

Processes used: communicating, comparing.

Sample findings: The children will find that there

are certain things which they do every day at the same time. Drawing pictures of these things and putting them in order will make the concept of a day clearer to the children.

Telling the time of day

Clocks tell you when it is time for school.



Clocks tell you when it is time for lunch.

When else do clocks help you?¹

102



Main concept of the lesson (pages 102–103):

Clocks tell you what time it is.

Performance objective: After studying the information provided in this lesson, the children should be able to

—explain that clocks help people know what time it is.

Important words: clock, time.

Teaching helps for the pictures above: Although the children may be familiar with the hours on a clock which are significant to them, they will probably not be able to read a clock with any degree of proficiency until later grades

¹ **Sample answer:** They tell me when it is time to go home from school and when it is time to eat supper.

FINDING OUT

- Get a can.
- Make a small hole in the can.
- Fill the can with water.
- Count until the water runs out.



How can a water clock show you that some time has gone by?¹



103

Teaching helps for "Finding Out":

Materials needed: large tin can, nail, hammer, water.

Processes used: observing, communicating, using numbers, measuring.

Sample findings: Your children will see that it takes a certain amount of time for the water to run out of the can. Have them fill the can several times, counting from the time it is filled until it empties. They will see that there is a

regularity to the amount of time it takes for the can to empty.

¹ *Sample answer:* The amount of water in the can gets smaller as time goes by.

Extending the "Finding Out": You may wish to have the children find out about other kinds of clocks which have been used by people. You may wish to bring in picture books about clocks and time for the children to look at.

Minutes



Minutes help tell time.
When do minutes seem
to go by slowly?¹

When do minutes seem
to go by fast?²

104

Main concept of the lesson (pages 104–105):
Minutes help tell time.

Performance objective: After studying the information provided in this lesson, the children should be able to

—estimate how long a minute is.

Important words: minute, time.

Teaching helps for the pictures above: Your children will most likely relate very well to the pic-

tures of the children above. Ask the children why time seems to be going by slowly for the children in the top picture. Ask the children why time seems to be going by fast for the children in the bottom picture.

¹ **Sample answer:** When I'm waiting in line for an ice-cream cone.

² **Sample answer:** When I'm playing with my friends.

FINDING OUT

- ▶ Find a minute timer.
- ▶ Turn it upside down.
- ▶ Close your eyes until you think a minute has passed.



How close was your guess?

105

Teaching helps for "Finding Out":

Materials needed: minute timer.

Processes used: observing, measuring, comparing, communicating.

Sample findings: At first your children may not be able to judge how long a minute is, but they can become more proficient by consciously experiencing

the length of a minute with the help of the timer.

Extending the "Finding Out": You may wish to have the children experiment with activities taking a minute. Have the children notice exactly how much they can write or how far they can walk in a minute.

Yesterday, today, and tomorrow



today



Yesterday we rode our bikes.
Today we are playing ball.
What did you do yesterday?

106

Main concept of the lesson (pages 106–107): Today is the present day, yesterday was the day before today, and tomorrow will be the day after today.

Performance objective: After studying the information provided in this lesson, the children should be able to

—explain that yesterday was the day before today, and tomorrow is the day after today.

Important words: yesterday, today, tomorrow.

Teaching helps for the pictures above: An important aspect of time is past, present, and future, presented in this lesson as yesterday, today, and tomorrow. When the bikes collided in the yesterday picture, the two children hurt their knees. In the today picture, both children have Band-Aids on their knees. In the tomorrow picture the knees are healed. Have your children tell incidents in their lives connecting yesterday, today, and tomorrow.



Tomorrow we will play
with the trains.

What will you do tomorrow?

A week



Sunday



Monday



Thursday



Friday

Main concept of the lesson (pages 108–109):

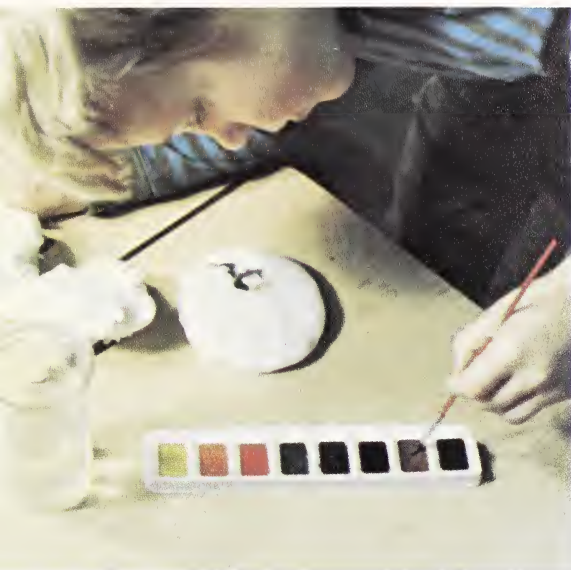
The time from Sunday through Saturday is a week.

Performance objectives: After studying the information provided in this lesson, the children should be able to

—list the days of the week;

—explain what a week is.

Important words: week, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday



Tuesday



Wednesday



Saturday

From Sunday through Saturday is a week.

What are some things you do on each day of the week?

Suggested activity: You may wish to have the children make booklets entitled "My Week." Inside each booklet there can be drawings of

what each child does on each day of the week. You may also wish to help the children make up a song concerning their weekly activities.

A month



How many days does
the month in the picture have?¹

In what month
is your birthday?



110

Main concepts of the lesson (pages 110–111):

The time in a year is divided into months.

A calendar tells how many days are in a month.

Performance objectives: After studying the information provided in this lesson, the children should be able to

- use a calendar;
- state what month they are currently in;
- state how many days are in the current month.

Important words: month, calendar, birthday, day.

Teaching helps for the pictures above: You may not wish to teach the twelve months of the year at one time. You may simply wish to make with the children a classroom calendar for each month as it comes. That way the children will gradually also learn the number of days in each month.

Sample answer: Thirty days. The children in the picture are counting the days of the new month before removing "31."

FINDING OUT

- Make a calendar for this month.
- Draw a cake on each day that is someone's birthday.
- Draw something for some of the other days.



How can a calendar help you?¹

111

Teaching helps for "Finding Out":

Materials needed: paper, crayons, ruler.

Processes used: communicating, interpreting data.

Sample findings: Your children will want to draw something significant for the date of an upcoming

party, an outing, a special game day. You may wish to have the children make their own calendar, one sheet for each month.

¹ *Sample answer:* It can help you know when your birthday is and when holidays are coming.

A year



Main concept of the lesson (pages 112–113): Some things happen at a certain time each year.
Performance objective: After studying the information provided in this lesson, the children should be able to
—state several events that occur once a year.
Important word: year.

Teaching helps for the pictures above: Your children will relate to the pictures showing events that occur once a year: a specific parade, Halloween, Victoria Day, Dominion Day, someone's birthday. You may wish to emphasize that the time from one Halloween to another, for example, is the time of a year.



What are some things that happen once a year?¹



113

Suggested activity: Your children may enjoy finding pictures which have to do with events which occur just once a year: Klondike Days, Halloween, Thanksgiving Day, Christmas, Hanukkah, Valen-

tine's Day, New Year's Day, or a local celebration.

Sample answer: Birthdays, Halloween, Thanksgiving.

The seasons

The seasons change during a year.

What is it like in fall?¹

What is it like in winter?²



114

Main concepts of the lesson (pages 114–117):

The seasons mark certain times in a year.

The seasons are fall, winter, spring, and summer.

Performance objective: After studying the information provided in this lesson, the children should be able to

—tell how the seasons differ from one another.

Important words: seasons, year, fall, winter, spring, summer.

¹ **Sample answer:** In fall, the leaves may fall from the trees and it may be cool.

² **Sample answer:** In winter, it may be very cold outside and it may snow.



What is it like in spring?¹

What is it like in summer?²

115

Teaching helps for the pictures above: Your children will most likely be able to tell you that the pictures above from left to right depict fall, winter, spring, and summer. Discuss with your children why the children in the pictures above are dressed as they are. They will notice that some of the children are dressed more warmly than others. Use that to begin a discussion about

the differences among the seasons in the area where your children live and in other areas of the country. Your children may wish to bring in pictures of themselves during each of the seasons.

¹ **Sample answer:** In spring, the weather begins to get warm and some flowers start to bloom.

² **Sample answer:** In summer, it may be very hot and then people can go to the beach.

FINDING OUT

- ▶ Have your class make pictures of the four seasons.
- ▶ Work on the season you like best.
- ▶ Put the pictures in order.
- ▶ Start with fall.



116

Teaching helps for "Finding Out":

Materials needed: coloured construction paper, scissors, paper, crayons.

Processes used: communicating, comparing.

Sample findings: Your children will most likely

enjoy working on a display of their favorite season. You may wish to correlate this "Finding Out" with an art class. Having the children put the seasons in order further develops the concept of the passing of time.



How are the seasons different?¹



117

¹ **Sample answer:** The leaves may change colour in fall, it may be cold in winter, the flowers bloom in spring, and it may be hot in summer.

Words to Know

day
nighttime
clock
time

minute
yesterday
today
tomorrow

week
month
year
seasons

Picture to Think About

About what time of day is it?
What will the children do now?
When will they come back to school?



118

Reviewing the important words: You may wish to use the words under “Words to Know” to help the children review the important words in this unit.
Applying knowledge: You may wish to encourage the children to apply the knowledge they have gained about some of the concepts in this unit. Have the children look at the picture under

“Picture to Think About.” Then have them read the questions above the picture and discuss their answers to the questions.

Sample answers for “Picture to Think About”: It’s time to go home from school. They will go home and play. They will come back to school tomorrow.

Questions to Answer

1. What are some times that can mark one whole day?
2. What things do you do once a week?
3. What things happen just once a year?
4. What are the seasons of the year?

Fun Things to Do

Have your friends hide something.

Ask them to sing a song.

Find it in the time they take to sing the song.

Find some things besides clocks and calendars that help people tell time.

Suggestion for evaluation: You may wish to use the questions under "Questions to Answer" to evaluate the children's understanding of the main concepts of the unit.

Sample answers for "Questions to Answer": 1. From bedtime to bedtime, from breakfast to breakfast, from lunch to lunch. 2. Visit my grandparents, go to church, go to the store, take piano lessons.

3. My birthday, Thanksgiving Day, Halloween, Valentine's Day. 4. Fall, winter, spring and summer. **For further involvement:** You may wish to use "Fun Things to Do" to involve the children in fun activities which reinforce some of the main concepts of the unit "Time." You may also wish to encourage the children to make up additional activities related to this unit.

6 Spaces and Places



Preparing for the unit: For a list of instructional materials helpful in teaching this unit, see page T12 of the Teacher's Manual. These instructional materials include general references for the teacher, books for children, and filmed or recorded materials. You may also wish to check

the list of materials needed for each "Finding Out" activity and have the children begin collecting these materials. The list of materials for each "Finding Out" activity is given under "Teaching helps for Finding Out" on pages 124, 125, 128-129, 132-133, and 136-137.



Why did Charlene skate into the mud? ¹

When is it helpful to know what is
in front of you or behind you? ²

121

Introducing the unit: You may wish to have the children look at the cartoon above. Then have the children read the questions below the cartoon and discuss their answers to the questions.

Sample answers for questions below the cartoon:

¹ Charlene skated into the mud because she did not know what was behind her.

² It is helpful to know what is in front and behind me all the time so I do not run into things and hurt myself.

In front and behind



What things are
in front of the girls?¹

What things are
behind the girls?²

122

Main concept of the lesson (pages 122–125): Some things are in front of people and other things are behind people.

Performance objectives: After studying the information provided in this lesson, the children should be able to

—name some things in front of and behind them;
—tell why it is important to know what is in front of and behind them.

Important words: front, behind.

¹ **Sample answer:** Ice-cream truck, man.

² **Sample answer:** Hot Wheels (tricycles)

These children know what is in front of and what is behind them.
Why might this be important?¹



Suggested discussion and activity: After the children have studied "In front and behind," you might pick out something in the room and describe to the children where this object is by telling them what is in front of and behind the object. Have the children guess what the object

is. The child who guesses the object then picks another object, describes where the object is, and has the class try to guess what the object is.

Sample answer: So they won't run into something and hurt themselves.

FINDING OUT

- ▶ Name some things you see in front of you.
- ▶ Name some things behind you.
- ▶ Turn around.



Now which things are in front of you? Behind you? Why?

124

Teaching helps for "Finding Out":

Processes used: observing, classifying, using spatial relationships, communicating.

Sample findings: The children may observe that the things which were in front of them are now behind them. And the children may also observe that the things which were behind them are now in front of them.

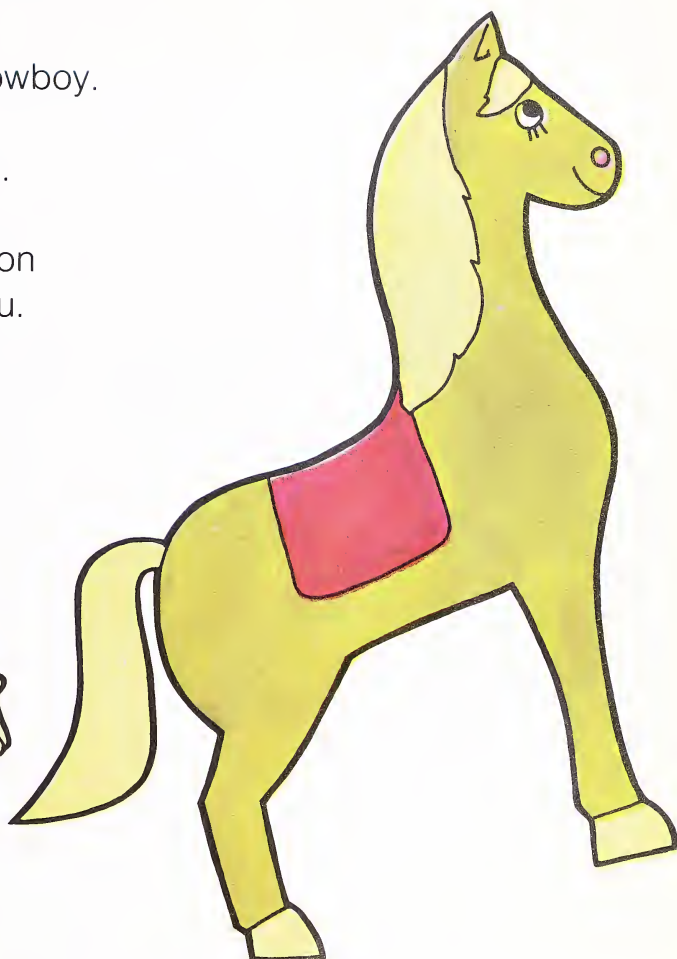
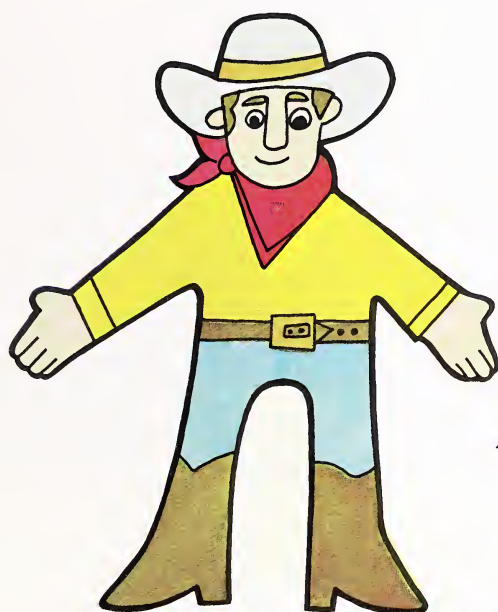
Additional information: You may wish to use the pictures above to point out that things may be

in front of or behind the children depending on the direction they face.

Extending the "Finding Out": After the children have discovered that things may be in front of or behind them depending on the children's position you might ask the children the following question: Besides turning around, what else might you do to make the things in front of you be behind you? (Sample answer: Move the objects from in front of me to behind me.)

FINDING OUT

- ▶ Draw a horse and a cowboy.
- ▶ Cut out the cowboy.
- ▶ Put the horse on a wall.
- ▶ Close your eyes.
- ▶ Try to put the cowboy on the horse in front of you.



How close did you come?

125

Teaching helps for "Finding Out":

Materials needed: paper, pencil, scissors.

Processes used: observing, using spatial relationships, communicating.

Sample findings: Some of the children will most likely get very close to the horse, while others may not get too close.

Suggested activity: After the children have studied "In front and behind," you might have the children play "Simon says" using the words *in front* and

behind. Have the child who is the leader use sentences such as "Simon says, 'Stand in front of your chair'" or "Simon says, 'Sit behind your desk.'" You might then explain to the children that the only time they should do something is when "Simon says" to do it. And if they do something which is not prefaced by "Simon says," they are out of the game. The last child in the game then becomes the leader for the next game of "Simon says."

Left and right



What things are on
the girl's left? ¹

What things are on
your left?

126

Main concept of the lesson (pages 126–129):
Some things are on people's left and other things
are on people's right.

Performance objectives: After studying the information provided in this lesson, the children should be able to

- name some things on their left and name some things on their right;
- tell why it is important to know what is on their left and on their right.

Important words: left, right.

¹ **Sample answer:** The lunch box, the ball.

What things are on
the boy's right?¹

What things are on
your right?



127

Suggested activity: After the children have discussed “Left and right,” you might have them try an activity which will reinforce their understanding of left and right. For the children to do this, have them make a puppet out of a small paper bag. You might suggest that they draw a mouth, a nose, the eyes, the ears, the hair, and some clothing on their paper-bag puppet. Then have the children put their puppet on their right hand. Then you might ask the children these questions:

Can you make your puppet bend to its right? Hop to its right? Run to its right? Then have the children put their puppet on their left hand and have them make their puppet bend to its left, hop to its left, and run to its left. Then you might have the children try making their puppet do other things while moving the puppet to its left and to its right.

¹ **Sample answer:** Pail, fence

FINDING OUT

- ▶ Stand up.
- ▶ Hop on your left foot.



- ▶ Shake your right arm.
- ▶ Close your left eye.

128

Teaching helps for “Finding Out”:

Processes used: using spatial relationships, communicating.

Sample findings: The children will most likely state that they could do all these things after they practised a little. The children probably

will suggest many other games using the words *right* and *left*, such as covering their left knees with their right hands, covering their right ears with their left hands, and holding their left feet with their left hands.

- ▶ Cover your right foot with your left hand.
- ▶ Cover your left eye with your right hand.
- ▶ Hold your right knee with your right hand.



Which of these things could you do?

What games can you make up using the words *right* and *left*?

Extending the "Finding Out": After the children have completed this "Finding Out," you might have each child think of an activity such as those in the "Finding Out" above. Then have the children play follow the leader with each child having a turn at being the leader. Or, you may wish to

bring in a record of the song "Hokey Pokey," which is a musical game based on identifying various parts of the body (i.e. the right leg, the left arm). The children's section of a public library may have the record.

Higher and lower



What things are higher than the children's heads? ¹

130

Main concept of the lesson (pages 130–133):

Some things are higher than people are and some things are lower than people are.

Performance objectives: After studying the information provided in this lesson, the children should be able to

—point out some things which are higher than they are;

—point out some things which are lower than they are.

Important words: higher, lower.

¹ **Sample answer:** Trees, jump rope, kite



What things are lower than
the children's heads? ¹

131

Suggested activity: After the children have discussed "Higher and lower," you might have them try an activity related to this concept. For the children to do this, have them look around the room and name some things higher than their heads. Then have them name some things lower than their heads. Then you might ask the chil-

dren if they can do anything to make more things higher than their heads. And if they can, have the children show what they would do. Then you might ask them if they can do anything to make more things lower than their heads. And if they can, have the children show what they would do.

¹ **Sample answer:** Bars, hands, floor, pictures.

FINDING OUT

- Blow up a balloon.
- Move around while keeping the balloon higher than your head.



How did you keep the balloon higher than your head?

132

Teaching helps for “Finding Out”:

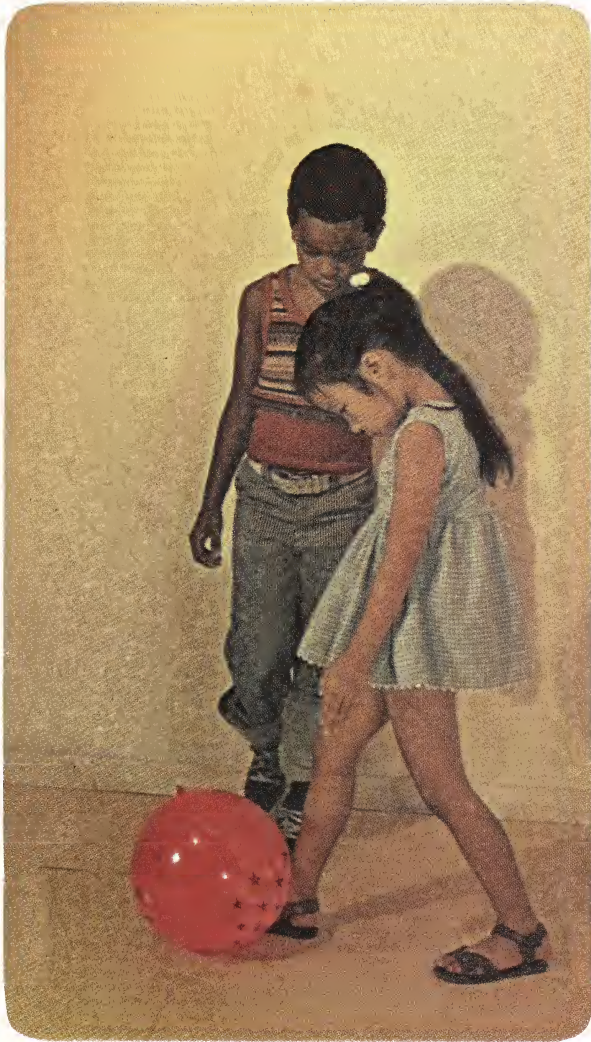
Material needed: balloon.

Processes used: using spatial relationships, experimenting, communicating.

Sample findings: The children will most likely state that they could keep the balloon higher

than their heads while moving about by hitting the balloon with their hands or with their heads. The children will most likely state that they could keep the balloon lower than their heads while moving about by kicking it or by holding it between their knees.

- Move around while keeping the balloon lower than your head.



How did you keep the balloon lower than your head?

Near and far



What things are
near the girls? ¹

134



Main concept of the lesson (pages 134–137):

Some things are near people and some things are far from people.

Performance objectives: After studying the information provided in this lesson, the children should be able to

—name some things that are near them and name some things that are far from them.

—tell why it is important to know what things are near them and what things are far from them.

Important words: near, far.

¹ **Sample answer:** Dog, orange, table



What things are
far from the boys?¹

135

Suggested activity: After the children have discussed “Near and far,” you might involve the children in an activity in which the concept of near and far can be reinforced. Have the children stand and tell what things are near them and what things are far from them. Then say “Go,” and have the children begin walking about the room. Then say “Stop,” and have the chil-

dren stand still and tell what things are near them and what things are far from them. Then you might ask the children to show you what they would do to make something that is now near them far from them. You might also ask the children to show you what they would do to make something that is now far from them near them.

¹ Sample answer: People, water, kite, clouds

FINDING OUT

- Pick something in the room while everybody's eyes are closed.
- Do not tell anyone what you picked.
- Walk around the room.



136

Teaching helps for "Finding Out":

Materials needed: none.

Processes used: using spatial relationships, communicating.

Sample findings: Most of the children will probably guess the object the child picked.

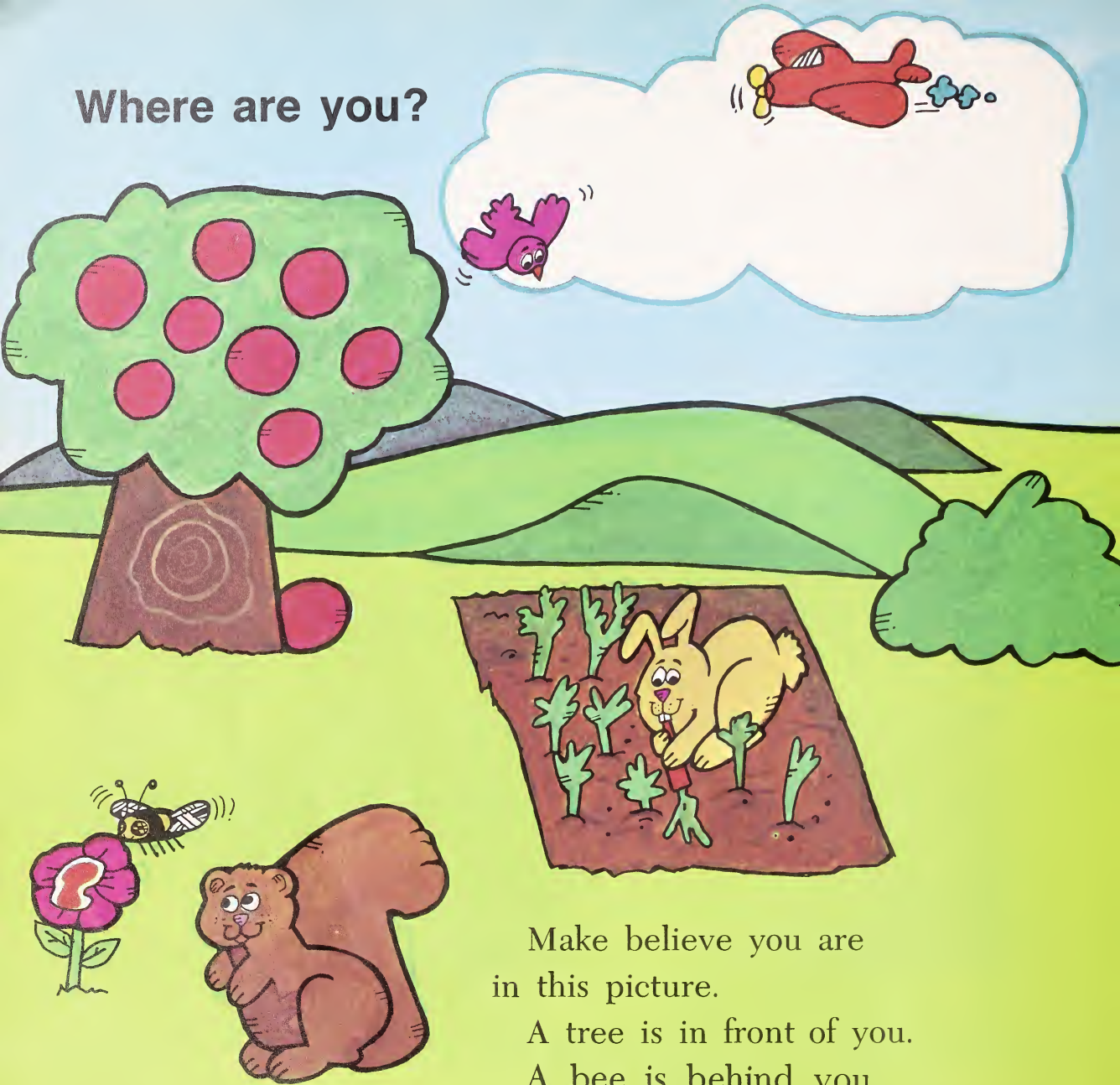
Extending the "Finding Out": After the children have completed this "Finding Out," you might suggest that a child pick an object in the room and use the words *front*, *behind*, *left*, *right*, *higher*, and *lower* as clues for guessing which object was picked.

- ▶ Have everyone guess when you are near to or far from what you picked.
- ▶ Have everyone try to guess what you picked.



Who guessed right?
Have that person pick something
for the next time.

Where are you?



Make believe you are
in this picture.

A tree is in front of you.

A bee is behind you.

Where would you be standing?

138

Main concept of the lesson (pages 138–139):

People can tell someone where they are by using the words *front*, *behind*, *left*, *right*, *higher*, *lower*, *near*, and *far*.

Performance objective: After studying the information provided in this lesson, the children should be able to

—tell someone where they are or where an object is by using the words *front*, *behind*, *left*, *right*, *higher*, *lower*, *near*, and *far*

Important words: *front*, *behind*, *left*, *right*, *higher*, *lower*, *near*, *far*.

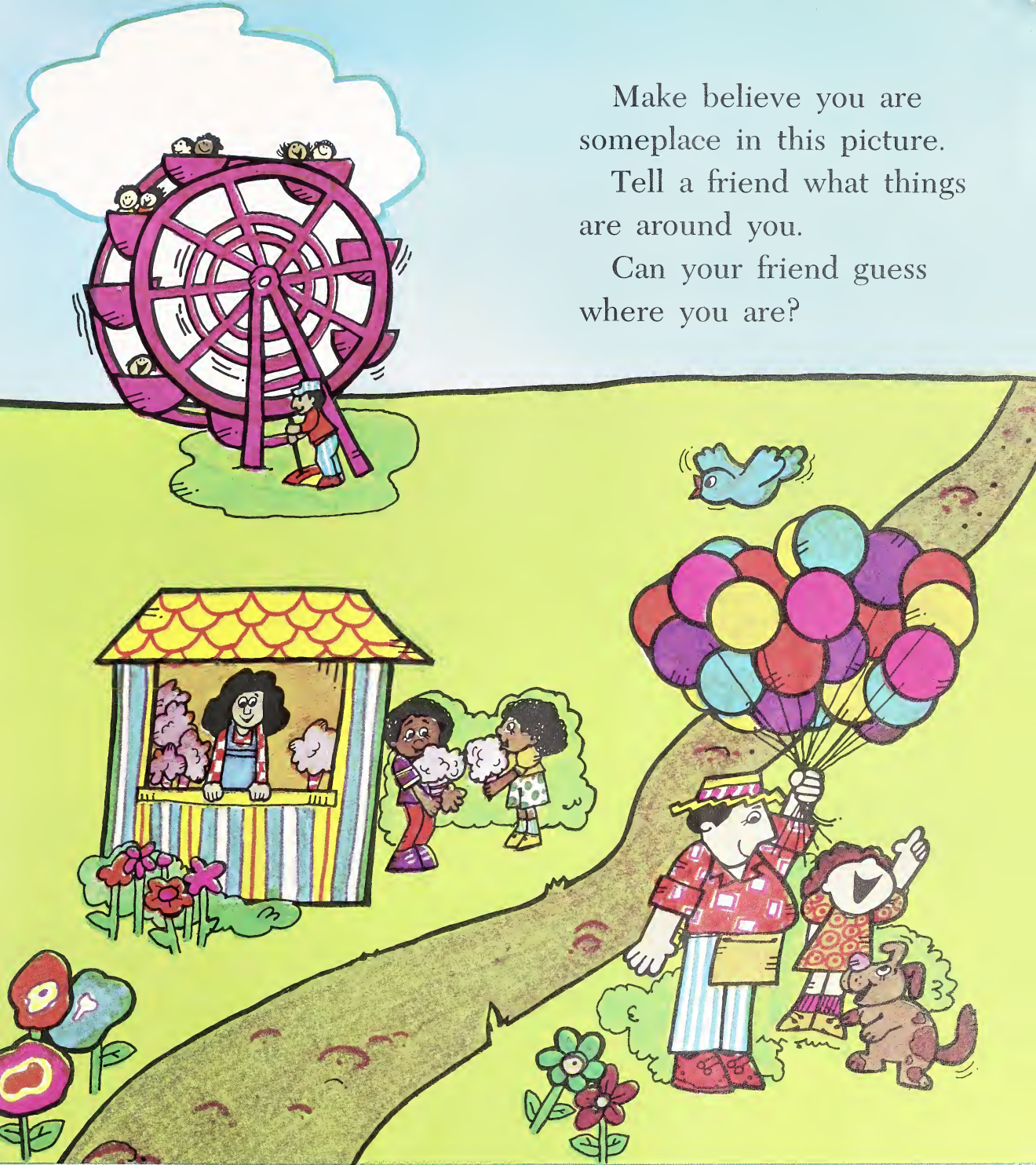
Suggested activity: Have the children draw a picture of themselves. Then have them cut out their pictures and use them to show where they would be in the picture if they were to make believe the following things. There is a squirrel on your left and a rabbit on your right. There is a rabbit on your left and an apple on your right.

Sample answer: Between the tree and the bee.

Make believe you are
someplace in this picture.

Tell a friend what things
are around you.

Can your friend guess
where you are?



Suggested discussion: After a friend has guessed where the one child is, have this child choose some other place in the picture to be and describe

where this place is by using the words *front, behind, left, right, higher, lower, near and far*. Then have a friend guess again.

Words to Know

front
behind
higher

lower
left
right

near
far

Picture to Think About



Tell where the boy is by using the words in “Words to Know.”

140

Reviewing the important words: You may wish to use the words under “Words to Know” to help the children review the important words of this unit.

Applying knowledge: You may wish to encourage the children to apply the knowledge they have gained about some of the concepts in this unit. Have the children look at the picture under

“Picture to Think About.” Then have them read the statement under the picture and try the activity suggested.

Sample answer for “Picture to Think About” The boy is behind the table lower than the balloon, near his parents and higher than the birthday cake.

Questions to Answer

1. What are some things in front of you? Behind you?
 2. What are some things on your left? On your right?
 3. What are some things higher than your head? Lower than your head?
 4. What are some things near you? Far from you?
-

Fun Things to Do

Have some friends close their eyes.
Hide something in the room.
Have your friends open their eyes.
Have them try to find what you hid.
Only answer questions like
“Is it near the door?” or
“Is it higher than the window?”
The person who finds what you hid
gets to hide it.

141

Suggestion for evaluation: You may wish to use the questions under “Questions to Answer” to evaluate the children’s understanding of the main concepts of the unit.

Sample answers for “Questions to Answer”: These answers will vary depending on the location of each child.

For further involvement: You may wish to use “Fun Things to Do” to involve the children in fun activities which reinforce some of the main concepts of the unit “Spaces and Places.” You may also wish to encourage the children to make up additional activities related to this unit.

Some Science Words to Know

Unit 1 Your Senses

hearing, 11
seeing, 8
smelling, 17, 20, 21
sounds, 11

taste, 15, 18–21
tasting, 19
touching, 13

Unit 2 Living Things

animals, 26, 29, 36, 42, 43
baby, 36, 37, 39
care, 34, 39
change, 33–35
father, 36, 37
grow, 33–35

living things, 26–29, 33, 39
mother, 36, 37
need, 40, 42, 43, 45
plants, 26, 29, 31, 34, 36, 40, 41
seeds, 34, 36

Unit 3 Sorting

alike, 50
colour, 52, 53, 59
different, 51, 57
feel, 60–62
hard, 63, 65

rough, 60, 62
shape, 57–59
smooth, 60, 62
soft, 63
sort, 52, 53, 55, 59, 61–63, 65–69

Unit 4 Light and Shadows

afternoon, 88, 89, 93

east, 86, 87, 89

light, 75, 77, 79, 82, 83, 85

morning, 86, 87, 93

noon, 90, 93

shadow, 76–81, 84–93

sun, 86, 88, 91

west, 88, 89

Unit 5 Time

clock, 102, 103

day, 98–101, 110, 111

minute, 104, 105

month, 110, 111

nighttime, 100

seasons, 114, 116, 117

time, 99–104

today, 106

tomorrow, 107

week, 109

year, 113, 114

yesterday, 106

Unit 6 Spaces and Places

behind, 122–124, 138

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front, 122–125, 138

higher, 130, 132

left, 126, 128, 129

lower, 131, 133

near, 134, 137

right, 127–129

(Acknowledgments continued from page 2)

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TEACHER'S MANUAL FOR

Exploring Science

ORANGE
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Introduction to THE LAIDLAW EXPLORING SCIENCE PROGRAM

Objectives of the program

THE LAIDLAW EXPLORING SCIENCE PROGRAM has been designed and developed to provide pupils with relevant, effective learning experiences in both the knowledge and processes of science. These learning experiences are presented in such a way that all teachers can be effective teachers of science. To help you and your pupils reach these goals, the authors and editors have selected the following objectives for the program:

- ▶ to provide an exciting study of science by appealing to pupil interest and curiosity;
- ▶ to develop up-to-date science concepts and understandings that are meaningful in the lives of pupils;
- ▶ to provide ample opportunities for pupils to explore science through easy-to-do, “hands-on” activities utilizing familiar situations and simple, everyday materials;
- ▶ to help pupils become skillful in using the processes of science;
- ▶ to integrate skills and concepts of the biological, physical, and earth-space science areas as well as skills and concepts of other disciplines;
- ▶ to provide a basis for the development of positive values and attitudes toward science in people’s everyday lives;
- ▶ to help pupils gain an awareness of the importance of their environment.

The following objectives reflect the concerns of teachers as to differences among pupils, cost and availability of materials, preparation time, and knowledge of science:

- ▶ to provide effective learning experiences for pupils with different interests and abilities;
- ▶ to utilize inexpensive materials that are common to the home or classroom for activities;
- ▶ to require preparation time and a background in science that are realistic for most elementary teachers.

Rationale and approach

A considerable part of the pupils’ everyday life involves science in one way or another. Using this rationale, the authors and editors have approached science through situations and materials that are familiar to the pupils. Because of this approach, THE LAIDLAW EXPLORING SCIENCE PROGRAM relates to the everyday life of the pupils. The following characteristics of the program reflect this general rationale and approach:

Activity oriented. Each level of the program incorporates a “hands-on” approach using familiar, everyday materials in easy-to-do activities. In this way the pupils explore, discover, or verify concepts and ideas about objects and events. The illustrations and text material support and guide the pupils in performing and interpreting these activities.

Integrated science. The program integrates the skills and concepts of the biological sciences, physical sciences, and earth-space sciences. Because the program approaches science as part of the pupils’ everyday life, multidisciplinary relationships occur naturally. Skills and concepts related to health, safety, math, music, history, art, language arts, geography, and other disciplines are integrated with science throughout the program. As a result, the pupils begin to look at the world in fresh, new ways.

Informal, highly visual style. THE LAIDLAW EXPLORING SCIENCE PROGRAM stimulates and maintains pupil interest through a direct, informal writing style and the use of full-color illustrations. The photographs and drawings have been selected not only for visual appeal but also to help explain, clarify, and provide greater insight. The informal writing style and full-color illustrations help create a program with which the teacher and pupils feel comfortable.

Use of humor. Another integral part of the rationale and approach is that a science program can be fun. Humor is effectively used to create interest and to involve pupils. For example, a cartoon based on an amusing incident is used to help introduce each unit. Humor is occasionally used to develop a concept within a unit, also.

Widening experiences. As brought out, THE LAIDLAW EXPLORING SCIENCE PROGRAM consists primarily of science which is part of the pupils' everyday life. However, the program also takes the pupils beyond this point. This is done by including certain science topics that are significant but may not be of an everyday nature. Many illustrations also serve to widen the scope of the pupils' science experiences. Because of these aspects of the program, the pupils are stimulated and aided in exploring the unknown and unusual.

Organization and content

The authors and editors have carefully structured the books to provide a consistent, functional organization which enhances effective teaching and learning. Timely and important content areas, such as the environment, are included in each book.

Units. There are six units in each book of THE LAIDLAW EXPLORING SCIENCE PROGRAM. Each unit explores a different topic of interest and importance to pupils. Balanced coverage of the life sciences, the physical sciences, and the earth-space sciences is maintained by having two units devoted to each of these three areas in each book. This carefully balanced content enables pupils to study the major areas of science every year. As pupils grow and mature from year to year, the content changes accordingly, taking into account the pupils' abilities, understandings, experiences, interests, and reading level.

The units can be studied in any order. Each unit is a self-contained teaching and learning unit. This adds a dimension of flexibility to the use of the program.

Lessons. Each unit is divided into lessons. The lessons aid in comprehension by breaking the unit topic into smaller teaching and learning packages. Each lesson provides information for an in-depth study of one or two of the main concepts of a unit.

Processes of science

Inherent in any type of learning experience—whether it is in science, health, math, or any other area—are certain processes of learning. In science, these processes are sometimes referred to as inquiry skills.

THE LAIDLAW EXPLORING SCIENCE PROGRAM provides many opportunities for pupils to develop skill in using the processes of science. These opportunities are presented throughout the text, illustrations, and special features of the program, especially each of the "Finding Out" activities.

For ease of identification and reference, a list of these processes, or inquiry skills, and a description of each have been included on the next page.

Observing. Using the senses—seeing, tasting, touching, hearing, and smelling—to find out about objects or events in the environment

Comparing. Recognizing ways in which objects or events are alike or are different

Classifying. Grouping objects or events according to their observed characteristics

Measuring. Finding out about an unknown quantity by comparing it with a known quantity

Using numbers. Applying the operations of counting and measuring to objects or events under observation or study

Using spatial relationships. Perceiving and describing objects in terms of their shape, motion, position, or location

Communicating. Conveying information by means of oral or written descriptions, pictures, graphs, charts, maps, demonstrations, etc.

Collecting data. Combining as many processes as necessary to obtain information about objects or events

Inferring. Figuring out a conclusion based on observations of an object or event

Interpreting data. Explaining the meaning or the significance of information regarding an object or event

Predicting. Describing in advance the outcome of an event or process based on observations or data

Hypothesizing. Arriving at general statements of concepts from observations and data

Experimenting. Designing and carrying out procedures to obtain reliable information about interrelationships between objects and events

Role of the teacher

For as many teachers of science that exist, there are at least the same number of science teaching methods. A method that works for one teacher may not work for another. Therefore, to be effective, each teacher must develop his or her own method of teaching science. The pupils' text and the Teacher's Edition have been designed to support and assist you in teaching and in developing a method of teaching science which is effective and enjoyable. Some of the general ideas that follow may also be of help to you.

Inquiry techniques. When teaching science, there has been a tendency for some teachers to feel that their role was mainly to dispense knowledge and answer questions. As a result, the teachers—rather than the students—did most of the work. It is often more effective for teachers to take on a different role, one in which they facilitate pupil inquiry.

To facilitate pupil inquiry, it is important for you to create an atmosphere of exploring, investigating, and finding out. To do this, you might pose interesting objects or problems for your pupils to investigate. During investigations, you might ask key questions now and then to stimulate investigation. You might also encourage your pupils to ask questions and have them try to find answers to their questions. You and your pupils may find that some questions have many answers and that others have no answers at all! These things will help keep your science lessons interesting and open-ended.

Flexibility. Another idea which may be helpful to you in developing an effective science teaching method is to try to remain flexible. For example, you may wish to follow the sequence of units as they appear in the program. Or, you may wish to vary the sequence according to the seasons to capitalize on pupil interest or availability of materials.

In addition to using the unit-opening cartoon to introduce a unit, you may want to make use

of an interesting demonstration or bulletin-board display. Another area in which being flexible is often important is the degree to which your science lessons are activity oriented. It is reasonable that you may want to make use of many activities for some lessons, but mainly use the text and illustrations for others.

To help enrich the concepts and activities in a unit, you may want to make use of community resources such as museums, factories, or parks. The possibilities are endless!

Intuition as well as logic. Another important point to keep in mind is that it is equally important for pupils to develop intuitive thought processes as well as logical thought processes.

Intuitive thought processes are those processes that involve calculated guesses, hunches, and ideas such as “What would happen if I tried this?”

Most scientists agree that after all calculations have been made and all logical ideas have been pursued, it is often an intuitive process that brings the final solution to a problem. Pupils sometimes need a chance to manipulate or “play” with an object or a problem with no specific or immediate goal in mind. Pupils will often intuitively come up with questions, ideas, or solutions of their own. Through these experiences, they may begin to gain an awareness and appreciation of the aesthetics—the sheer beauty—in science.

Features of THE LAIDLAW EXPLORING SCIENCE PROGRAM

Basic features

The features of THE LAIDLAW EXPLORING SCIENCE PROGRAM have been developed and designed to excite pupils about science by providing high interest, visual appeal, involvement, relevancy, and success for pupils. These features can be categorized as basic features which permeate the entire program or as special features designed primarily for organizing and emphasizing content and activities. This section describes the basic features of the program.

Illustrations and format. Perhaps the most obvious features of the program are the colorful illustrations and the open, uncluttered format. These two visual features create an attractive, appealing invitation to study science.

The illustrations are not only an important source for interest and appeal but they are also valuable aids to learning. Each illustration has been carefully selected for the purpose of help-

ing to explain, clarify, add new meanings, or provide greater insight.

The many illustrations which depict children in familiar situations help motivate pupils and involve them in the text. The illustrations also help pupils recognize that science is a part of their everyday life.

“You” approach. To further the pupils’ feeling of involvement, the text has been written using the “you” approach. The authors and editors have written the text as if they were speaking directly to each pupil.

In-text questions. Not only does the text involve the pupils personally, but it also elicits responses from them by means of frequent questions. Most of the questions are inductive questions. They help the pupils relate their experiences and the

ideas presented in the text to the total concept being developed. Some of the questions involve the pupils' opinions or feelings.

Vocabulary. The number of unfamiliar words has been kept to a minimum. However, if a word important to the understanding of a concept is unfamiliar, the pupils are given an opportunity to use it many times to help strengthen their understanding of the word.

Readability. To help ensure ease of reading, the vocabulary and sentence length have been controlled according to "The Spache Readability Formula." Furthermore, extra space has been inserted between words to help ensure ease of reading.

The special consideration given the program's readability to ensure pupil success and interest is further emphasized by these previously mentioned basic features:

- ▶ a clear, direct writing style;
- ▶ illustrations that help pupils visualize topics and concepts;
- ▶ an open, pleasing format;
- ▶ a "you" approach that makes use of pupils' experiences;
- ▶ in-text questions to involve pupils.

Metric measurements. Metric measurements (SI) are used throughout the program. Metric symbols and terminology are based on the *Metric Style Guide* and the *Metric Practice Guide*.

Special features

A variety of interesting and effective special features appear throughout the program. These special features are designed to help organize and present the content and activities of the program.

Unit introduction. A colorful, two-page introduction for each unit is designed to stimulate

pupil interest and to focus on the topic of the unit.

The first page contains the unit title and a colorful illustration. The illustration is made of three-dimensional art and carries the theme of the unit.

The second page contains an imaginative, full-color cartoon. The cartoon is followed by questions which help focus attention on the unit topic.

Short, inquiry-oriented lessons. Each lesson is introduced by a brief title which helps describe the lesson. The lessons are kept to a manageable length—some lessons are only one page and others are two facing pages. The lessons contain a minimum of text for the pupils to read. The text usually consists of one or two questions. These questions ask the pupils to respond to the pictures or to apply an idea developed in the lesson to their own experiences. Pupils who are not yet able to read can understand much of the lesson just by looking at the pictures.

"Finding Out." In THE LAIDLAW EXPLORING SCIENCE PROGRAM an activity feature, titled "Finding Out," occurs frequently throughout each book. Each of these activities provides opportunities for pupils to gain "hands-on" experiences and to use the processes of science. The concepts developed in the text are enhanced and extended through these activities.

In each "Finding Out," the steps for carrying out the activity are clearly and simply stated. The materials needed for the activity are simple, inexpensive, and easily found in the school or home. The setup of these materials is shown for the pupils to help them carry out the activity. Some of the activities require no materials at all.

The activity also includes questions which ask the pupils to explain their findings or relate their findings to the concept being developed. Many times, questions which open end the activity are given.

A few dimensions of flexibility in this feature are of particular note. Each “Finding Out” activity has been designed so that it can be carried out by individual pupils, by small groups, or by the entire class. Substitutes for materials shown in the activity can often be used. For example, the pupils may want to use glass jars instead of milk cartons if they are more readily available or if the pupils think they will give better results. Even some of the steps can be altered to fit the situation or the interests of the pupils.

“Words to Know.” At the end of each unit, the important vocabulary words from each lesson are listed. This list provides the teacher and pupils with a handy tool for reviewing the important words of the unit.

“Picture to Think About.” This end-of-unit feature contains a full-color illustration depicting some of the main concepts of a unit. The fea-

ture also has a question or statement about the picture, which helps the pupils apply the knowledge they have gained from the unit.

“Questions to Answer.” The next feature at the end of a unit is a list of review questions. These questions are designed to help evaluate the pupils’ understanding of the main concepts of the unit.

“Fun Things to Do.” This feature is the last feature in every unit. It provides opportunities for pupils to reinforce and extend some of the concepts of the unit by means of simple, fun-type activities.

“Some Science Words to Know.” A combined word list and index is provided at the end of the book. The list of words can be used to review the vocabulary for the units of the book. Page numbers for each word are given for ease of reference.

Teacher’s Edition for THE LAIDLAW EXPLORING SCIENCE PROGRAM

Purpose and physical features of the Teacher’s Edition

The purpose of the Teacher’s Edition for THE LAIDLAW EXPLORING SCIENCE PROGRAM is to provide you, the teacher, with a variety of teaching aids which you can use conveniently and efficiently. The Teacher’s Edition has been designed to help you guide your pupils in developing science concepts with ease and confidence.

The Teacher’s Edition consists of full-color reproductions of each page from the pupils’ text with extended bottom margins followed by a twelve-page Teacher’s Manual. The copy and pictures from the pupils’ text appear in the same size in the Teacher’s Edition as in the pupils’ text to help ensure ease of reading.

The inclusion of the pupils’ pages makes it possible to easily point out something on the page for the pupils. The extended bottom margins make it possible to have a variety of specific teaching helps immediately available on the lesson page. Teaching helps which appear on the reproduced pupils’ pages are printed in blue for easy identification. The Teacher’s Manual contains information to help you understand and use all the components of the program effectively.

The sturdy wire binding of the book allows you to handle and use the Teacher’s Edition easily and conveniently.

The Teacher’s Manual

The twelve pages which follow the reproduced pupils’ text are referred to as the

Teacher's Manual. The Teacher's Manual contains information that will help you understand and effectively use THE LAIDLAW EXPLORING SCIENCE PROGRAM. The Teacher's Manual consists of the sections that follow.

Introduction to THE LAIDLAW EXPLORING SCIENCE PROGRAM. The objectives and approach of the program are presented with related science and science-teaching background information.

Features of THE LAIDLAW EXPLORING SCIENCE PROGRAM. The features of the program are described, and the function of each of the features is explained.

Teacher's Edition for THE LAIDLAW EXPLORING SCIENCE PROGRAM. Each feature of the Teacher's Edition is described. Suggestions as to how you can use each of the features in teaching are explained.

Instructional Materials. This section consists of a bibliography of instructional materials. The listing includes printed materials, films, and recorded materials. These instructional materials are categorized as general references or as materials appropriate for a particular unit.

Features appearing in the extended bottom margins

A wide variety of teaching helps are conveniently located in the extended bottom margins of the Teacher's Edition.

Preparing for the unit. This feature appears on the first page of each unit. It contains page references for books, films, and recorded materials listed in the "Instructional Materials" section of the Teacher's Manual that are appropriate for use with the unit.

The page reference for each "Finding Out" activity in the unit is also included. This pro-

vides an opportunity to have your pupils collect, in advance, the materials needed for each activity.

Introducing the unit. The second page of each unit contains suggestions for using the unit-opening cartoon and questions to help introduce the unit to your pupils.

Sample answers for questions below the cartoon. The second page of each unit also contains sample answers the pupils might give for the questions below the cartoon. The questions and their answers are marked with corresponding superscript numbers.

Main concepts of the lesson. The main concepts of each lesson are concisely summarized on the first page of each lesson. This helps you see at a glance the main ideas to emphasize in teaching the lesson.

Performance objectives. Also appearing on the first page of each lesson is a list of performance objectives. The objectives state in behavioral terms the main things your pupils should be able to do after they have completed the learning experiences provided in the lesson. The objectives are stated simply and can be used to help you and your pupils establish specific cognitive goals for the lesson.

Important words. The important words of each lesson are also listed on the first page of each lesson. You may wish to use this list to emphasize certain words that are important in understanding the main concepts of the lesson and in strengthening science vocabulary.

Suggested activity, discussion, or research. Very often throughout a unit, suggestions for enriching a lesson are given. These suggestions may be ideas for a simple activity, a thought-provoking discussion, or some interesting research. Sometimes, a combination of suggestions is

given, such as “Suggested activity and discussion” or “Suggested discussion and research.”

Teaching helps for “Finding Out.” This feature appears on each page that has a “Finding Out” activity. The teaching helps are divided into sections. The first section, titled “Materials needed,” lists the materials needed for the activity.

The next section, titled “Processes used,” contains a list of the science processes that your pupils will develop and utilize during the activity. A list of these processes and their description appears on page T5 of the Teacher’s Manual.

Another section, “Sample findings,” describes what your pupils may find out while doing the activity. Of course, your pupils’ findings may go far beyond those given. However, being aware of some of the possible findings in advance can help you in guiding the pupils in their activity and discussion. Instead of or in addition to “Sample findings,” the section “Sample answers” may appear, giving sample answers to questions in the activity.

Two other sections which sometimes appear in this feature are “Additional information” and “Extending the ‘Finding Out’.” “Additional information” may provide helpful hints for carrying out the activity. Or, it may provide background information helpful in explaining the findings. “Extending the ‘Finding Out’” contains suggestions for expanding the “Finding Out” or carrying out another activity related to the “Finding Out.”

Teaching helps for pictures. The illustrations in each lesson are designed to help develop the concepts of the lesson. On many of the pages, specific teaching helps for using a picture are given.

Sample answers for in-text questions. Throughout the pupils’ text are many questions for the pupils to think about and answer as they read the material. Sample answers to these questions are provided for you to help you keep a smooth

flow of discussion in your classroom. Of course, your pupils’ responses may vary, and in many instances there are no right or wrong answers. The purposes of listing sample answers are to alert you to the kinds of answers your pupils are likely to give and to help you in guiding the discussion of the lesson. For ease of identification, the questions and the answers to the questions are marked by corresponding superscript numbers.

Reviewing the important words. This feature appears on the first color-tinted page at the end of each unit. It encourages you to have your pupils review the vocabulary words under “Words to Know” on that page.

Applying knowledge. This feature encourages you to have the pupils look at the picture in “Picture to Think About” and answer the question or statement that accompanies the picture.

Sample answer for “Picture to Think About.” This feature provides a typical answer that the pupils may give to the question or statement that accompanies “Picture to Think About.”

Suggestion for evaluation. This feature appears on the last page of each unit. It encourages you to use the questions under “Questions to Answer” on that page to help evaluate the pupils’ understanding of the main concepts of the unit.

Sample answers for “Questions to Answer.” This feature provides typical answers that the pupils may give to the questions under “Questions to Answer.”

For further involvement. This feature appears on the last page of each unit. It offers suggestions for encouraging your pupils to carry out the activities in “Fun Things to Do” on that page and other fun-type activities which help reinforce some of the concepts developed in the unit.

Instructional Materials

General references for the teacher

Blough, Glen O. and Schwartz, Julius. *Elementary School Science and How to Teach It*. Toronto, Ontario: Holt, Rinehart and Winston, 1974.

Up-to-date information in the different subject areas of science taught at the elementary level is provided in this book.

Crocker, Robert K. *Elementary Science Curriculum Study (1-3)*. Scarborough, Ontario: McGraw-Hill Ryerson, 1973.

This teacher resource book, developed at Memorial University, Newfoundland, provides a good framework for activities that may be done in the classroom.

Elementary Science Study: Animals in the Classroom and Light and Shadows, 2nd Edition. Scarborough, Ontario: McGraw-Hill Ryerson.

Gega, Peter C. *Science in Elementary Education*, 3rd Edition. Rexdale, Ontario: John Wiley & Sons, 1977.

This book provides a comprehensive explanation of how to teach elementary science. Part I introduces science organization, strategies, evaluation and lesson planning. Part II contains model lesson plans that encourage children to learn through the development of their own critical thinking skills.

Science 5/13 Series: Early Experiences and Early Explorations. Agincourt, Ontario: GLC Publishers, 1973.

These teacher resource books contain many practical ideas and activities for classroom use.

Unit 1 Your Senses (pages 6-23)

Domanska, Janina. *What Do You See?* Cambridge, Ontario: Collier Macmillan, 1974.

Ramsbottom, Edward. *My Five Senses*. Toronto, Ontario: Macmillan Company of Canada.

Simon, Seymour. *Finding Out with Your Senses*. Scarborough, Ontario: McGraw-Hill Ryerson, 1974.

The Five Senses, filmstrip series—set of 5, 35 frames each. Scarborough, Ontario: Prentice-Hall of Canada.

"Learning with Your Senses," film, 11 minutes. Markham, Ontario: Coronet Instructional Media.

"A Thousand Eyes," film, 10 minutes. Toronto, Ontario: City Films.

Unit 2 Living Things (pages 24-47)

Cameron, Ann. *The Seed*. Mississauga, Ontario: Random House of Canada, 1975.

Fay, Herman. *My Sea*. Don Mills, Ontario: Thomas Allen and Son, 1974.

Fisher, Aileen. *Once We Went on a Picnic*. Don Mills, Ontario: Fitzhenry and Whiteside, 1975.

Gross, Ruth B. *What Do Animals Eat?* Richmond Hill, Ontario: Scholastic-TAB Publications, 1973.

Hawes, Judy. *Spring Peepers*. Don Mills, Ontario: Fitzhenry and Whiteside, 1975.

Macdonald Starters Activities: Growing Things Indoors. Agincourt, Ontario: GLC Publishers, 1974.

Wildsmith, Brian. *Squirrels*. Toronto, Ontario: Grolier of Canada, 1975.

"The Animal Movie," film, 10 minutes. Toronto, Ontario: National Film Board.

Habitat, filmstrip series—set of 5. Toronto, Ontario: Holt, Rinehart and Winston.

Places Where Plants and Animals Live, filmstrip series—set of 5, records or cassettes, 11-13 minutes each. Toronto, Ontario: Visual Education Centre.

"Seeds Grow into Plants," filmstrip, with record or cassette. Agincourt, Ontario: Cinemedia.

"The World of Living Things," filmstrip, 38 frames. Don Mills, Ontario: Educational Film Distributors.

Unit 3 Sorting (pages 48-71)

Hoban, Tana. *Circles, Triangles & Squares*. Cambridge, Ontario: Collier Macmillan, 1974.

Macdonald Starters Activities: *Collecting Things*. Agincourt, Ontario: GLC Publishers, 1974.

Macdonald Starters Series: *Colour*. Agincourt, Ontario: GLC Publishers, 1974.

Developing Elementary Concepts, filmstrip series.

"Size: Smaller Than Large and Larger Than Small" (order No. X305B)

"Shape: A Circle Is Never a Square" (order No. X305C). Mississauga, Ontario: Cenco Canada.

Stories About Shapes, filmstrip series—set of 4, records or cassettes, 10 minutes each. Markham, Ontario: Coronet Instructional Media.

Unit 4 Light and Shadows (pages 72-95)

Branley, Franklyn M. *Light and Darkness*. Don Mills, Ontario: Fitzhenry and Whiteside, 1975.

Macdonald Starters Activities: *Light and Shadows*. Agincourt, Ontario: GLC Publishers, 1974.

Schwalberg, Carol. *Light and Shadow*. Scarborough, Ontario: McGraw-Hill Ryerson, 1972.

Simon, Seymour. *Light and Dark*. Scarborough, Ontario: McGraw-Hill Ryerson, 1970.

"Light for Beginners," film, 11 minutes. Markham, Ontario: Coronet Instructional Media.

"Light and Shadows," filmstrip and cassette. Mississauga, Ontario: Cenco Canada.

"The Size and Shape of a Shadow Can Be Changed," film and study guide. Mississauga, Ontario: Cenco Canada.

Unit 5 Time (pages 96-119)

Kessler, Ethel. *All About Fall*. Scarborough, Ontario: McGraw-Hill Ryerson, 1974.

Slush Slush! Scarborough, Ontario: McGraw-Hill Ryerson, 1973.

Splish Splash! Scarborough, Ontario: McGraw-Hill Ryerson, 1973.

McInnes, John and Murray, William. *Telling the Time*. Don Mills, Ontario: Thomas Nelson and Sons (Canada), 1975.

"The Calendar: Days, Weeks, Months," film, 11 minutes. Markham, Ontario: Coronet Instructional Media.

"Finding Out About Day and Night," filmstrip, 26 frames. Don Mills, Ontario: Educational Film Distributors.

The Seasons, filmstrip series—set of 5, records or cassettes, 11-13 minutes each. Toronto, Ontario: Visual Educational Centre.

"The Seasons: A Journey through a Year" and "The Seasons of the Year," filmstrips, with records or tapes. Agincourt, Ontario: Cinemedias.

"Seasons in the City—Summer and Fall" and "Seasons in the City—Winter and Spring," filmstrips, with records or tapes. Scarborough, Ontario: E.T.H.O.S.

Unit 6 Spaces and Places (pages 120-141)

Cobb, Vicki. *Sense of Direction: Up and Down and All Around*. Scarborough, Ontario: McGraw-Hill Ryerson, 1972.

Hoban, Tana. *Big Ones, Little Ones*. Agincourt, Ontario: Gage Publishing, 1976.

Over, Under, & Through. Cambridge, Ontario: Collier Macmillan, 1973.

Simon, Seymour. *Everything Moves*. Don Mills, Ontario: Fitzhenry and Whiteside, 1976.

Developing Elementary Concepts, filmstrip series.

"Direction: Can You Somersault Sideways?"

"Location: Over and Under and in Between," Mississauga, Ontario: Cenco Canada.

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